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EDITORIAL NOTES.

The Institution and the Gas Engineer.

MEMBERS of the Institution are meeting to-day for more or less formal business, with a short address from the President (Mr. John Bond) and a report or two for consideration. Opinion seems divided as to whether the Council have done wisely in curtailing the meeting in this manner, on the ground that the conditions prevailing and pressing upon the industry through the war would have resulted in a poor attendance. There are other members of the Institution who feel that the current conditions are ones that call more than ever for conference and for personal intercourse between the professional men of the industry, and that the halving of the ordinary time devoted to the annual meeting would have been preferable to what is practically an abandonment, or a reduction to almost a formality, which appears to forbid absence from home. However, we believe that the Council—having at their command the advice of the representatives of the District Associations, who are in touch with the views of gas men in all quarters of the country—have taken what they deemed to be the correct and prudent course, and the course that is consonant with the feelings of the majority of the members.

On the very day that this meeting of (for the Institution) extraordinary character is being held, there appears in our columns an article by Mr. James Macleod, in which he bluntly puts the question: "Is the Institution a Failure?" The question is not a new one to many men. It has long been confronting our correspondent; and the conclusion to its consideration by him is not at all favourable to the Institution. In fact, he is unable to arrive at any other answer than an unqualified affirmative. The matter that has prompted him to communicate his views on the subject at the present time is the plaint of an engineer (who has felt the iron heel of the modern *genus* of municipal councillors) that the Institution has not done anything, and does not seem likely to do anything, towards protecting members of the profession in municipal service against oppression and degradation; and therefore he thinks the time has come when a Municipal Gas Engineers' Protection Society should be formed. The suggestion of our correspondent [who desires to remain *incognito*] was incorporated in the recent editorial article on "Official Municipal Targets;" and Mr. Macleod regards the suggestion as a most "damnatory in-"dictment" of the Institution. He does not discuss the idea of the formation of a Municipal Gas Engineers' Protection Society; and there are few municipal gas engineers who would be prepared to do so publicly. As a matter of fact, few municipal gas engineers would care to openly identify themselves with such a society; and we rather fancy that its service would be much curtailed, both as a defensive organization and an offensive one in assailing the objectionable methods of the hooligan type of town councillor. An *ad hoc* society, in our opinion, could never effectually take in hand the question of dealing with the trouble which is making municipal service increasingly distasteful.

The Institution with its membership is the only body that might develop a plan for such work. But the Institution has not the power to take it in hand. If the Memorandum and Articles of Association are studied, it will be found that the Institution—while empowered to take part, financially and in other ways, in co-operative effort intended to promote the advancement of the industry—is debarred from entering upon work such as appertains to a trade union. The fact that the Institution is practically denied the right of taking any interest in its *personnel* apart from working in directions that will improve the knowledge of the members is a distinct limitation to effective usefulness. The prohibition, however, can only be taken as a partial answer to some of Mr. Macleod's questions—such as the one, "Is there in any body of professional or semi-"professional rank an Institution which has less to show "in the way of achievement towards the welfare of its "members?" Then the only answer that can be given to another of his questions, "What body should be able to "protect the gas engineer if not the Institution?" suggests the necessity of extending its working powers; for there is no other body exclusively composed of gas engineers, and therefore no other body so eminently qualified for defending the rights and the privileges of the members. But has the Institution shown by its past deeds that it is qualified to take in hand work of this kind? Mr. Macleod's article is an indictment of it in respect of a perennial incapacity for not doing over well the few things that in normal times are taken in hand, and a capacity for maintaining the number of things taken in hand at as low a level as possible.

At one time there were hopes that the Institution would try to pull itself together, and live a larger life. When Mr. Andrew Dougall was President in 1903, there was a little flutter occasioned by the appeal to this end in his Inaugural Address. The curve-line of hope rose in those who desired to see the gas profession established in its rightful place among other professions; the curve-line had a precipitous descent. It took an upward bound again after the Presidential Address of Mr. James W. Helps in 1910. It once more fell sharply; and now the prospect of a real larger life for the Institution seems almost hopeless. Other organizations have been forced into being through the self-imposed rigid limitations of the Institution; and it has largely forfeited the title to being the central representative body, from the mere fact that the more imposing and practical work for the industry is done by these other organizations. The British Commercial Gas Association is a body essentially distinct from the Institution, the Gas Companies' Protection Association is the same, the Society of British Gas Industries is the same, the Sulphate of Ammonia Association is the same, the London Coke Sales Committee is the same. Strip the Institution of the glory which belongs alone to these bodies, and it presents a rather naked ineffectiveness. Even in regard to special technical work, it was only due to what was done as a tribute to the memory of Sir George Livesey that the Institution was able to embark on a little original research work—not through an experimental works or a laboratory of its own, but mainly through the University of Leeds.

There can be no denying the fact, as Mr. Macleod intimates, that the "man in the street" has no conception of the gas engineer as a man of important professional rank, nor has he any notion that upon him rests responsibilities of an order far in excess of those of many professional men who are more in the public eye. In some municipal councils, we often get indications of the little that is really thought of the position of the gas engineer. He is a plebeian among professional men. The Institution has unconsciously helped to foster this notion by inaction, by hole-in-the-corner methods, and by the pursuit of a largely stereotyped policy and procedure. It has done little or nothing to make the outer world feel that the gas engineer must have attainments and bear responsibilities higher and weightier than the village pedagogue—that he is, in short, a man of position, and is therefore well worthy of good remuneration. A broader and more open Institution policy would have counteracted this—a policy befitting the changes and trend in other quarters and matters. We see men (worthy men in many respects) who have not been properly equipped for gas engineering and management set up by municipal bodies in the place of chief engineer; we see the idea that lower salaries or immovable ones are considered equitable under conditions of higher responsibilities and more harassing demands than at one time obtained; we see the effects on discipline and on the anxieties of official life through the meddling with purely managerial and technical affairs by the new types introduced into our local administrations; we see, too, salaries

offered to technically trained assistants that make one blush for the standard of fair dealing existing in certain quarters. The Institution, in its corporate capacity, has not done anything to counteract these things.

The accusations of Mr. Macleod stand out boldly, and to controvert them will be difficult—in fact, impossible; particularly those referring to the absence of any effort on the part of the Institution to improve and to maintain the status of gas engineers in the professional world. He would have the Institution take an active part in making strong representation to local authorities wherever and whenever injustice is shown to gas engineers. He would have the educational position of the members of the profession improved by formulating an examination, and for this purpose appointing an Examination Board. He points to the fact that the Institution has failed to provide a central building or meeting place for its members, and suggests an annual levy for a few years for this purpose. Of course, it is not only a question of the provision of such a building, but its upkeep. Other Institutions, however, manage to provide and maintain a home for themselves. The Council only last year voted the nucleus of a fund for the purpose of—in time—securing such an establishment. The ideas of the Council on this matter, however, seem to be of an order that will permit of consummation after a few more generations of gas engineers have come and gone. There is confidence that there would be a larger technical efficiency to the credit of the Institution itself if it were more active outside the indurated policy from which there has hitherto been no real effort to escape. Just now the Council are engaged on fresh work—work provided and necessitated by the war; and some of it is of a most momentous character to the immediate interests of the industry. They cannot be asked to divert their attention from this work to consider questions which should and must occupy attention when the concerns of the industry are of more normal character. Meantime, when the minds of the Council and of the ordinary members of the Institution require a little relief from current pressing demands, they might be turned upon the consideration of the questions as to what can be done to give the gas profession greater recognition and a stronger position among professional men generally and in the outer world, and as to the best lines for the Institution to pursue in broadening its policy and living to a greater extent in the eyes of the world. Then, later on, the matter could be raised; and something valuable should result from the prior consideration expended upon it.

Members of Parliament and Coal Supplies—A Conference Arranged.

In furtherance of the resolutions passed at the recent meeting of representatives of gas and electricity undertakings, in regard to the question of the supplies of coal to them during the period of the war, a conference has been arranged with members of Parliament for June 9, at five p.m., at the House of Commons. This is the most important step that has been taken as a result of the meeting at the Institution of Electrical Engineers; for it is abundantly clear that very little can be done towards mitigating the present, and the possible worse prospective, conditions without the intervention of the Government. Hence the conference; and hence, too, the desire of the large representative deputation appointed for the express purpose of having an interview with members of Parliament that the administrators of all gas and electricity undertakings in the kingdom should urge their local members of Parliament to be present at the conference on the 9th prox.

In a chance conversation the other day with Mr. D. Milne Watson, the Chairman of the London Coal Supplies Committee (through whom the Board of Trade have been, and are, working in connection with the feeding of London with coal during these times of abnormal pressure), he emphasized the fact that, at the conference, it will be made perfectly plain that the two industries are fully satisfied with the steps taken by the Government in respect of the export of coal to neutral countries, and moreover that they have complete confidence in the Committee who have undertaken the onerous work which the regulation of exports demands. What, however, the two industries are anxious to do is to inform members of Parliament of the imperative necessity of not omitting any possible measure that can be promptly put into force not only to increase supplies but to facilitate distribution, as well as to ease the cost of conveyance by sea, in view of the pressure that there will be next autumn and winter, with a recurrence of troubles in transport due to the shortening of the daylight hours, and probably other circumstances. Few members of Parliament really understand the seriousness of the position to the gas and electricity industries, and through them to the community and other industries depending upon them for supplies of light, heat, and power; nor, it is feared, do they fully appreciate how much depends upon the full service of gas and electricity to factories producing war material; nor do they know how much reliance has to be placed to-day upon certain secondary products of the carbonization of coal for the provision of munitions of war, and the requisites for the production of dye stuffs and colours. The question of the coal supply to the two industries is therefore a national one and of first importance; and upon this the deputation from the gas and electricity industries desire to inform members of Parliament. Therefore, it is to be hoped that all gas and electricity directors and committees will do their utmost to secure the attendance at the conference of their local representatives in Parliament; for it is through their influence that any further desirable step with the object of relieving the situation must be taken.

Turning from this particular coming event to the general question of coal supplies, wherever gas men meet the one or principal topic of conversation is that of coal supply and prices. It was so at the meeting of the Southern District Association at Cambridge on Wednesday last. In a letter asking to be excused accepting the invitation of the Chairman and Directors of the Cambridge Gas Company to luncheon, Sir Corbet Woodall remarked that the situation was so difficult in connection with coal supplies that he felt it quite impossible to take the time off even for the great pleasure the trip to Cambridge would have given him. The difficulty is generally felt. On that occasion and others, we heard and hear of stocks on gas-works being considerably below the normal for this time of the year, and of the serious danger that confronts with week passing week without the position materially mending. The question of price, too, is not less a matter of extreme gravity. The miners in the federated area of England have obtained a 15½ per cent. war bonus, which is equivalent to 25 per cent. on the old wage standard of 1888, and 17½ per cent. on the new wage standard. The men of Northumberland and Durham have received 15 per cent. on the 1879 standard; those of Scotland, 18¾ per cent. on the standard rates of 1888; and those of South Wales, 17½ per cent. on the 1879 standard. As a result of the war bonus, the coalowners of Lancashire and Cheshire, at a meeting in Manchester last week, decided to put up the price of household and certain other classes of coal 3s. 4d. per ton, and in North Wales the owners have resolved upon an all-round advance of 2s. 6d. per ton. The miners get their increase; and it is passed on to the consumers. Which is only fair. But the Departmental Coal Committee, appointed by the Board of Trade, showed in their report that the price of coal had been increased to figures since the war started much beyond what was warranted by the additional costs of production. Since then prices have continued their upward move; so that they have been further exceeding what was warranted by the extra cost of production due to the war. Now comes the addition on account of the war bonus. What is happening in this connection? The "Iron and Coal Trades Review" states that in South Wales the war bonus increase of 17½ per cent. upon the standard rates of pay will represent an addition to the cost of production of 1s. 6d. per ton. But "in some of the English coalfields where the cost of pro-"duction is very considerably less than it is in South "Wales, the increase due to the bonus may not amount to "more than 7d. or 8d. per ton at the pit-head." Therefore, the figures previously quoted as the agreed additions in certain areas to the selling prices of coal to compensate for the war bonus indicate the not very laudable desire of the coal-owners to make the bonus the excuse for a further increment of profit. When parliamentary regulation of coal prices is spoken of, it means regulation consistent with the increase in costs due to the war; anything above what is consistent with this increase of costs is an unwarranted burden on the country at a time when financial burdens have been heaped upon the individual and upon the whole nation.

The question of licences for the export of coal to British owned gas undertakings in neutral countries is an interesting one, and affects many British shareholders. It is stated that the Primitiva Gas Company have been refused a licence for

the shipment of a cargo of coal. It may be that there was something exceptional about the proposed shipment. But it is not believed, in well-informed quarters, that this refusal points to a rule which will be generally observed. Should, however, it prove otherwise, and it is to be the policy of the Committee to prohibit all similar exports, those concerned in British capitalized gas companies carrying on operations in neutral countries will perhaps ask how the Committee can justify permission to exports being granted to (say) the European Gas Company for their stations in France. Of course, a line has to be drawn somewhere. France is an ally; the production of her coalfields has been very seriously interfered with by the war; and like ourselves she requires all the material possible for the making of war munitions. Nevertheless, the Primitiva Gas Company, the Monte Video Gas Company, and others that could be named are as much British owned as the European Gas Company; and therefore there does not seem any sufficient reason why the boundary line should not be drawn after the British capitalized companies in neutral countries, and not between them and British owned companies in the countries of our Allies. The matter (as we pointed out last week in referring to the remarks of Mr. Charles Hunt on the subject) is an important one for the former; for their burdens are, especially in South America, extraordinarily great. It would, of course, be possible for the Primitiva and the Monte Video Companies to obtain their coal from America; but it would be just as easy for the London Gas Companies to do the same. This statement, taken in conjunction with the fact that the coalowners in America are making "hay" while the war favours, tells a tale. We are hoping we shall hear that the Committee have roped-in the British capitalized gas companies in neutral countries as being deserving of their favourable consideration, unless coal of equal value for their particular purposes can be obtained by them on similar terms elsewhere.

The Carlisle Railway Disaster.

The railway disaster which occurred early in the morning of last Saturday week north of Carlisle, and which caused a terrible loss of life through three trains—including a heavy laden troop train—and five engines being involved, has again raised the question of the use of gas for lighting railway rolling stock. Two of the trains—a local and the troop one—the newspaper reports inform us, used gas as an illuminant, while the third (the Scotch express) was fitted for electric lighting. We hardly imagine that at seven o'clock on a May morning, the carriages were artificially illuminated. Nevertheless, the daily papers have been so well tutored by people interested in electricity and railway carriage electric fittings that they at once jumped to the conclusion that gas was responsible for the fire. The electrical papers, too, have followed suit, as they would do. It is so much easier for them to lend a hand in stimulating the conclusions of ignorance, than to give the plain deductions of technical knowledge. In this life destroying accident, there were five locomotives practically on top of each other, with the incandescent contents of their ash-pans scattered among the dry splintered wreckage, and heat being radiated from the engines. These conditions—to say nothing of the oil-splashed woodwork due to the lubricants—are sufficient without gas to cause rapid ignition and spread of the fire.

But, electrically speaking, the fire must have been "due" to gas. The driver of the local train gave it as his "opinion" (we rather fancy he must have been dazed at the time of the accident) that the fire was caused by the explosion of one of the gas-cylinders. It was an "opinion" only. On the other hand, a brakesman saw a "tongue" of flame shoot out. What the brakesman saw is more likely to have been the case than that the fire was occasioned by the explosion of a cylinder. How on earth a cylinder could "explode" unless it had its contents mixed with air and a spark was introduced, or was first subjected to intense heat, has yet to be explained. But electrically the idea is accepted. In the Aisgill disaster, one of the passengers saw a large sheet of flame follow the accident. This sheet of flame was away in the air, and not in immediate contact with the wreckage. In his report on the Aisgill accident, Major Pringle said: "On the point of origin, it is necessary to consider the bearing which the evidence given by Mr. Bain has upon the question. The five cylinders carried under the floor of the two wrecked vehicles were subjected to experiment after they had been removed from the wreck. The experiments go far towards proving that, if the perforations and apertures described by Mr. Bain were all the immediate result of the collision in *less* than three minutes after engine No. 446 had finally come to rest in the wreckage, all the gas remaining in the cylinders must have escaped." That is the common-sense of the matter; and the escaped gas, there can be no doubt, was ignited in the air (causing the flash seen) by the flying sparks from the engines. According to our electrical contemporaries, however, gas that has escaped under pressure from the cylinders has a knack of hanging about amid the wreckage for their convenience in providing a case for electric lighting.

Most of the electrical papers have had a turn at the fact that there were gas-cylinders beneath the coaches of two of the trains. The "Electrical Review"—the paper that indulged in somewhat extravagant language regarding the Aisgill disaster, and had satisfied itself as to the cause of the fire before Major Pringle had time to inform it that it was wrong in its conclusions—is temperate. "As for the burning of the trains," it says, "there is only too much reason to believe that it was *due* to the use of gas on two at least of the three trains that were involved." Our contemporary should state the nature of the "reason," instead of wasting time and space with so many "we's"—"*We* almost despair," "*we* have constantly dwelt," "*we* have urged," and "*we* fear." The "Electrician" says: "We have frequently called attention to this matter; and the Board of Trade have also stated the desirability of discontinuing the use of gas." The secondary position occupied by the Board of Trade in these sentences is instructive. However, this contemporary thinks the public have a right to know what "steps have been taken, and are being taken, to abolish gas lighting on passenger trains, so as to ensure that, if an accident does occur, it will be at least free from the horrors of fire." The little our contemporary knows of the causes of fires on trains is sufficiently exemplified by the last dozen or so words. There have been some very horrible things occur in coal mines through electricity; and there have been some unpleasant experiences on subterranean railways through the same cause. But there has been no such silly and furious writing about these affairs, as there have been about the small quantity of gas carried in cylinders under railway coaches, which gas is promptly dissipated by its own pressure if there are any means of escape from the cylinders.

Wounded Gas Workers in Hospital.

We are proud of the men and the number of men who have gone from the gas industry to uphold at the front the honour of our country, and to fight for liberty. Many of the men have returned to this country wounded, and are in hospital in different parts of the country. Mr. John Webster, the Manager of the Provan Gas-Works, makes in our "Correspondence" columns a very practical and human suggestion. It is that, as many of these men are in hospital far away from their native towns and friends, the manager of the gas-works nearest to the hospital should be kept posted as to the names, rank, and number of such men. "I have no doubt whatever," remarks Mr. Webster, "that the manager would be only too pleased to visit the wounded soldier, and send any information to his relatives. I have also no doubt that the soldier would be comforted and cheered by the visit."

Some More Comparisons

Further reports have come to hand with regard to the financial and working results of municipal gas undertakings for the year which ended in March. They are, it will be noted, of a generally satisfactory character—particularly when all the adverse circumstances are taken into consideration. First of all, there is Bingley, where a good increase in the sale of gas has been chiefly responsible for a loss in the preceding year being turned into a profit for the past year. The balance of profit has been carried to the reserve fund; and though not large, it betokens a gratifying condition of affairs in present circumstances. Whereas last year at Coventry the net profits allowed of rate relief to the extent of £5000, and the transfer to the sinking fund of £7000, on the present occasion the available surplus is only £5084, the whole of which the Committee recommend shall be carried forward to the next account. From Evesham there is reported a substantial increase in the quantity of gas sold, notwithstanding the discontinuance of the greater part of the public lighting. Of the profit,

£600 has been contributed to the rates. A decreased profit at Heywood is attributed to short time in the cotton trade, and to the usual lighting restrictions and unsatisfactory markets for residuals. The gross profit, at £6200, was £570 less than the previous year. The revenue from gas sales at Lancaster was practically the same as in the preceding twelve months; and the returns from residuals, in spite of the unfavourable general conditions, amounted to about 83 per cent. of the cost of coal. The latter figure, and the net cost of gas (10·43d. per 1000 cubic feet sold), are outstanding features of the accounts. Substantially more gas was sold at Leek, and the accounts generally make a satisfactory showing when compared with those of the previous year. The gas sold per ton of coal carbonized was the highest in the history of the undertaking.

And Satisfactory Working Results.

Another instance of a debit balance on the previous year having been changed into a credit balance for the past twelve months is provided by Maryport, in spite of a large payment out of revenue for new carbonizing plant. This modern retort-bench resulted in nearly 6 per cent. more gas being made, though some hundreds of tons less coal was carbonized. Figures recorded at Middleton are considered extraordinarily good, considering the adverse circumstances through the war. Smaller amounts were received for both gas and residuals; but the unaccounted-for gas was reduced, and the amount of gas made per ton of coal carbonized was a record. A very good year has been experienced at Newbury; a substantial increase in net profits being reported, as the result of improved working and a larger sale of gas. The Committee recommended, in the first place, a contribution of £400 to the rates; but in deference to opinions expressed when the matter came before the Council, this figure was altered to £500. In the case of Sedgley, sales of gas show a very gratifying increase. A slightly increased net profit has resulted at West Bromwich; and this has been carried to the net revenue appropriation account.

A War Exhibition.

In the ordinary course of things during this clouded summer, manufacturers and traders in this country would hardly favour taking part in a general exhibition, and people would not be inclined in any large numbers to patronize it; but there would be an exception in the case of an exhibition arranged for the purpose of mitigating in some degree the measureless suffering caused by the war. Such a War Exhibition has been organized in aid of, and under the patronage of, the Anglo-Belgian Red Cross Committee, and will be opened this month in the premises of the Prince's Skating Club, Knightsbridge, S.W. In any case such an effort would be deserving of hearty support; but the debt that this country owes to the Belgian nation makes it doubly so. The aim is to present in an interesting and instructive manner an idea of the extent to which science and industry are being utilized in every branch of the present gigantic struggle. There will be seven sections, one of which will include the latest scientific instruments used in connection with war, and another food and hygiene. In expressing the wish that the exhibition may prove a complete success, it may be pointed out that offers of assistance of every kind towards making it so will be welcomed by the Hon. Organizing Secretary, War Exhibition, London Chamber of Commerce, No. 97, Cannon Street, E.C.

The Conversion of the Stoke-on-Trent Council.

We heartily congratulate Alderman Mitchell, the Chairman, and his fellow-members of the Stoke-on-Trent Gas Committee, upon obtaining a large majority of the members of the Council to support their policy of fair pay for the holder of the responsible position of Chief Engineer and Manager of their gas undertaking, although the pay offered is not by any means extravagant even when it reaches the maximum. It will be remembered that the Committee originally advertised for a successor to the late Mr. William Langford at a commencing salary of £500, rising to £700, with coal and light free. When in April the matter came before the Council, the "coal and light free" condition was first excised. The false economists then again set to work, and knocked £100 off the salary, leaving the maximum an open question. It was not a pleasant duty, but it was nevertheless our duty, to point out certain truths to the then majority of the Council who supported the policy of encouraging inefficiency through parsimony. Alderman Mitchell and his colleagues made inquiries, with the result that they came before the Council with a motion (to which were affixed the signatures of 33 members) that the record as to the parsimony of certain councillors should be rescinded, and that the terms of the original resolution should replace it. This was agreed to by a large majority, but with the deletion of the words "coal and light free." We are sure the incident will have good effect not only in the Stoke-on-Trent Town Council, but elsewhere. The inquiries of the Gas Committee have shown them that their first convictions are the right ones—that if the Council require a man as Gas Engineer and Manager of ability, knowledge, and experience, one impressed with a full sense of the responsibilities of the position, and a man of high integrity, they must pay for such a man. Members of the Council and other councils should understand that it cannot be to their interests nor the interests of the ratepayers to have municipal service looked upon as being less attractive than company service. As it is, the Council are saving about £900 a year in salaries, compared with three or fours year ago, when there were separate Managers for the four gas-works.

Gas-Furnaces in War Time.

This is a subject of present interest; and it is good to know that gas is in great and increasing request for fuel purposes by manufacturers for the production of munitions of war. Since the formation of District Committees to inquire into, and to increase and organize, the production of shells and other munitions of war, a veritable boom has resulted in the demand for gas-furnaces; so much so that many of the larger engineering firms are now requiring service mains of considerably greater gas-carrying capacity for furnace plant for annealing, hardening, shell heating, &c. This popularity of gas-furnaces in this time of stress for munitions was touched upon by Mr. E. P. Taudevin, of the Richmond Gas Stove and Meter Company, Limited, in a lecture he delivered before the Leeds Society of Engineers on Thursday last, under the auspices of the Leeds Corporation Gas Department. The audience exhibited very keen interest in the different applications described in detail by the lecturer. The item of outstanding interest, and which Mr. Taudevin dealt with at length, concerns a new departure in gas-furnace construction, and which is called the "L.P.G.A." system of heating—that is to say, low-pressure gas and air. This is the most recent development in gas-furnace design by the Richmond Company; and it is one which promises a wide field of usefulness. The working of the furnace is fully described in the lecture, of which we give a *résumé* in other columns. The feature of the new design is that both the gas and air required for combustion are fed into the furnace chamber through separate ports—the former without the usual primary air arrangement. The pressures of both gas and air are extremely low, varying in each case (according to the temperatures required) from 20·10ths down to 2 5·10ths. Under the latter condition, suitable heats may be maintained in the furnace chamber; and at this low pressure no possibility of "lighting-back" occurs, while the working conditions are near perfection. The new furnaces are now used for annealing, re-heating, and normalizing steel on a large scale; and thus again town gas as a commercial fuel is making a further incursion into the larger requirements of furnace work. The new "L.P.G.A." system of furnace heating is also applicable to forging, crucible, lead, and salt bath furnaces, with the considerable range of temperatures available.

The Diesel Engine.—In the course of a conversational lecture to the members of the Junior Institution of Engineers, Mr. W. A. Tookey, M.I.Mech.E., referred to the many excellencies of design apparent in the Diesel engine as constructed by British engineers, and called attention, by means of lantern slides and a number of large-scale drawings, to the details of operating mechanism, particularly in connection with the fuel-valve, fuel-pump, governor, compressor, and valve-gear.

Italian Society's Meeting again Postponed.—It may be remembered that the annual meeting of the Italian Gas and Water Association, which was to have been held in Padua in September last, was postponed until the 14th ult., when it was to take place in Rome. The programme appears in the last number to hand of the Association's "Bulletin;" but attached to the wrapper is a slip announcing the further postponement of the meeting for an indefinite period. The decision is evidently the result of the disturbed condition of Italy.

THE INSTITUTION OF GAS ENGINEERS.

MEETING TUESDAY, JUNE 1, 1915.

THE PRESIDENTIAL ADDRESS DELIVERED BY

Mr. JOHN BOND, of Southport,

Engineer and Manager of the Corporation Gas Department.

Gentlemen,—In June last year you conferred upon me the honour and privilege of being the President of the Institution. I appreciate fully the confidence you bestowed in me; and, in return, I am proud to say that, through the support received at the hands of your Council and other members, the interests of the Institution and the gas industry generally have been carefully guarded.

Abandonment of the Southport Meeting.

The resolution of the members that the annual meeting should be held in Southport has been frustrated owing to the great war in which this nation is engaged. At the present time a large number of men of His Majesty's Army are billeted in Southport; and it was found impracticable to hold a successful meeting, with the usual social functions, in the town.

Your Council have further honoured me by asking me to accept the office of President for a second year; but as I have been called upon to do work in connection with the High Explosives Department of the War Office, my Gas Committee realized that to continue in this important office as President would mean a certain neglect of other pressing duties. The action of my Gas Committee in this matter was no doubt a wise one; for the members thought that the best interests of the gas industry would be served by devoting the greater portion of my time to work of national importance.

Gas Residuals and the War.

During this war crisis, it has been realized—probably for the first time by some—that the gas industry plays an important part in the welfare of the nation, by providing residual products for the manufacture of dyes, disinfectants, drugs, high explosives, &c., and by the production of solid and gaseous fuel for the manufacture of all classes of war material and other articles too numerous to mention. Indeed, the gas industry may be looked upon as one of the chief mainstays of the nation.

At an early stage of the war, this country was confronted with the fact that Germany held the dye industry, and that something like 200 million pounds' worth of cotton, woollen, and other goods were dependent upon dyes before they could be sold in the markets throughout the world.

The Dye Industry.

The Government was at the outset asked by the Chamber of Commerce to give its support to a scheme for the manufacture of certain synthetic dyes. This appears to me to have been a reasonable request; and I consider that the Government should assist, not only the dye industry, but all industries throughout the country, as far as possible. It cannot be expected that capitalists in this country will risk their money in the building-up of new industries, unless some support is guaranteed by the Government, and that such industries should not be subjected to unfair competition. The value of aniline dyes used in Great Britain amounted to approximately two million pounds per annum, of which less than 15 per cent. was produced in this country. Lord Moulton and the Board of Trade have given a great amount of attention to the manufacture of synthetic dyes and colours; and it is known that the Government have offered financial support to a well-considered scheme which it is understood will be under British control.

Now that we have the promise of a State subsidy, there is no time like the present to build-up an industry which through many causes has allowed the German manufacturer to secure a monopoly in chemical dyes. It is admitted that the German chemical industry has the support of their Government; and it is an agreeable surprise to find that the British manufacturer was able to secure even 15 per cent. of the dye business, for he not only had higher wages to pay to his workmen, but was also confronted with certain restrictions in the use of alcohol, which plays an important part in the dye industry. I maintain that this nation has at her command as good (if not better) scientists and commercial men as can be found in Germany or any other part of the world; and the building-up of a dye and colour industry is largely dependent on scientific research and business organization.

The Government has promised to contribute £100,000 over a period of ten years for research in aniline dyes alone; but this sum appears to me to be inadequate for this most important work.

Tar for Road Purposes.

In certain districts it has been customary for local authorities to use large quantities of crude tar for road-spraying purposes, instead of complying with the Road Board recommendation, and applying only dehydrated and refined tar for this work.

The War Office Authorities realized that a large amount of the products, such as toluol and phenol, used in the manufacture of high explosives was being wasted on the roads, instead of being secured to assist the army in this great conflict. The War Office, therefore, requested that the local authorities should, during the war crisis, use nothing but dehydrated and refined tar for road work; and though this order may have put many gas undertakings to considerable inconvenience, I am convinced that the local authorities will find the prepared tar is far superior for road purposes to the crude tar which they had previously used.

There are certain reasons why crude tar should not be employed on roads; and I consider that gas undertakings will be well advised to adopt one of the many simple tar-refining processes on the market—especially as the method of refining is an inexpensive one. Where such a plant for refining tar has been installed, it is essential, in complying with the War Office order, that the distillation of the tar should be carried to a temperature of not less than 220° C., to ensure the removal of the whole of the toluol from the tar, along with a quantity of phenols. The necessity for refining tar at this temperature is of more importance during the war crisis than in times of peace. For making a heavier tar, a large quantity of which is used, not only for road work, but also for the manufacture of asphalt in our own district, we find it necessary to distil the tar to a temperature of approximately 250° C.

A book entitled "General Directions and Specifications Relating to the Tar Treatment of Roads," published by Messrs. Waterlow and Sons, of London Wall, E.C., will be found most useful to those engaged in refining tar for road purposes.

Coal Crisis.

It is necessary for the members of our industry to consider seriously the question of present and future coal supplies; for we are informed that no fewer than 217,000 coal miners have enlisted in His Majesty's Army. These miners are all skilled men and physically fit. They represent approximately one-half of the miners of military age, and one-fifth of the total number of miners in the country. A miner's position is difficult to fill; and though some 70,000 men have been drafted from other industries to the mines, it will be a considerable time before these unskilled men can take up the duties of those who have joined the army. The effect of this upon the gas industry is considerable in diminishing the output of coal; and in almost all gas undertakings the usual stocks of coal have been largely depleted. The demand for coal in the various industries has risen

above the normal, and the gas industries throughout the country are faced with the difficulty of obtaining sufficient supplies to replace the stock of coal necessary for winter requirements.

The price of coal during the last ten years has advanced by leaps and bounds. Looking through the Southport contracts for coal, I find that the Gas Committee in 1905 purchased rough slack and nuts at an average price of 8s. 8d. per ton. The average price of slack and nuts immediately before the war crisis was 12s. 1d. per ton. At the present time we are confronted with a further advance of 5s. per ton—making the average price of slack and nuts 17s. 1d. per ton. The market may warrant this increase in price; but as coal is vitally necessary to the great industry we represent, and as many millions of people are dependent upon a gas supply, I consider that the Government should have taken steps to restrict in some measure these excessive advances. The Board of Trade have recently prohibited certain exports of coal. It would be interesting to know why some action could not have been taken earlier, and so have prevented the possibility of coal leaving the country and finding its way to our enemies through neutral countries.

A well-attended and representative meeting of men interested in gas and electrical undertakings met in London on May 6, under the chairmanship of Sir Corbet Woodall, to consider the situation in respect to coal supplies. It is pleasing to know that a Joint Committee will approach the Government with a view to obtaining better and cheaper deliveries. It appears to me that coal will remain at a much higher price than it was ten years ago; and if we are to sell gas at anything like the figure previous to the war crisis, it will be necessary to look around and ascertain whether any further economies can be effected.

Many difficulties have been overcome in the past by engineers responsible for the prosperity of the gas industry. The effect of increased wages to gas labourers, and less hours worked, has been neutralized by the adoption of improved methods of manufacture and distribution. There is no doubt that all improved methods are the direct outcome of research; and to counteract the higher prices of raw material, I suggest that it will be necessary to establish research laboratories in gas engineering, carbonization, purification, and distribution, and the work undertaken should be carried out in a whole-hearted manner, as there are many problems yet to be solved throughout the industry.

Gas Heating Apparatus.

During the past few years, great advances have been made in the efficiency of all gas apparatus used for heating purposes. The Council of the Institution some years ago wisely inaugurated a gas heating research which was carried out at the University of Leeds. Interest was shown in this research by the University authorities and the gas industry. The manufacturers of gas heating apparatus realized the value of this class of work; and we find that they have established physical and chemical laboratories in their various undertakings, so as to enable them to conduct their work in a scientific manner, instead of adopting rule-of-thumb methods.

With respect to gas-fires, these have been given the attention that they deserve; and through the influence of science and skill displayed by the workers, a marked increase in the efficiency of gas-fires is manifest. At the outset, it was realized that radiant energy should be the chief aim of the experimenter. But at the same time a small percentage of low-temperature convected heat, to help the aggregate efficiency, should not be despised; for it must not be forgotten that a large proportion of the radiant energy of a gas-fire finally passes to convected heat.

As an example of the great interest that has been shown in connection with gaseous heating, we have eminent professors and other scientific men working with the object of discovering some simple method for determining the radiant efficiency of gas-fires. A method known as the "Leeds Test," devised to ascertain the radiant energy of gas-fires, in which Professor R. H. Smith's radiometer plays an important part in obtaining the amount of radiation received at a central area of a hemisphere of known radius, was employed by the Gas Heating Research Committee. One of the objections to this method is the amount of time taken in making a test.

It may be interesting for you to know that a number of experiments have been carried out in the physical laboratories of the Southport Gas Estate, with the object of obtaining a reliable apparatus for testing gas-fires on simple lines. Experiments have been made with specially constructed thermopiles and bolometers, to obtain horizontal as well as hemispherical tests of the radiation. The conclusion arrived at is that the standard test shall be a hemispherical one. The horizontal test is considered to be of value in conducting experiments on various "fuels;" and it is also useful as a guide in the adjustment of the flames to secure the highest efficiency.

Quite recently there have been described in the Technical Press methods for testing gas-fires which have been carefully thought-out in the laboratories of Messrs. R. & A. Main, the Davis Gas-Stove Company, the Richmond Gas-Stove Company, and the Imperial College of Science and Technology.

A Committee has been formed to consider the question of a standard radiometer; and no doubt the results of their deliberations will be placed before the Institution at an early date.

Great care should be taken in the fixing of gas-fires; and I maintain that if a fire is properly fitted, it is an easy matter to secure 70 to 75 per cent. of the total heat value of the gas in radiation and low temperature convected heat. Attention should be paid to the outlet-flues of gas-fires; but it should be borne in mind that this is not the proper place to ventilate a room effectually and economically.

Municipal gas undertakings are confronted with greater difficulties in trading in gas heating apparatus than are gas companies; and though our own Corporation Gas Department reserve the right to supply cookers and fix them on consumers' premises, it was decided that the business in gas-fires and heating apparatus should be done by the ironmongers and plumbers of the town. After careful consideration, the following scheme was adopted.

The Southport Corporation Gas Department supply gas-fires and other gas heating apparatus to all plumbers and ironmongers in the town who can make a good show of them at their respective shops. All gas-fires and heating apparatus are fixed free of charge to the consumer. The expense involved in the fixing, including labour and material, is paid for by the Corporation. Should a plumber or ironmonger sell a fire or other heating apparatus, he is given the work of fixing it, and for such work he is paid by the Corporation the net cost of the material and labour *plus* 30 per cent. But should the net cost exceed 30s., then the Corporation pay the net amount *plus* 25 per cent. Should a plumber or ironmonger be unable to effect a sale, but can persuade the customer to have a fire on the hire-purchase or simple hire system, he is paid as a commission 10 per cent. on the list price of the apparatus hired, and is given the work of fixing at the same rate of pay as other apparatus sold outright. The whole of the fittings paid for by the Corporation remain the property of the Corporation.

The Gas Department have show-rooms in the town; and in all cases where gas-fires are sold or let on hire-purchase or simple hire, the fixing of the same is divided among the plumbers and ironmongers *pro ratâ* on the amount of business they do in gas-fires and other heating apparatus.

The advantage to the Gas Department is that a number of successful window exhibits of gas apparatus can be made throughout the town and in the outlying districts. With all this class of gas apparatus it is essential that a suitable maintenance scheme be established by the gas undertaking, as the consumer has neither the time nor, in many cases, the inclination to adjust the various burners and "fuels" necessary for the efficient working of the apparatus.

Leeds University.

In alluding to the valuable work which has been accomplished at the University of Leeds, it is pleasing to note that members of the Court, Council, Senate, and Faculties of that Institution have taken a keen interest in various subjects closely allied with the gas industry. We are particularly fortunate in having a man of Professor Cobb's ability to fill the Livesey Memorial Chair; and we have confidence that, under his guidance and with the support of his co-Professors, the scientific side of the gas industry will receive the attention it deserves.

Exceedingly interesting and instructive work in ventilation has been accomplished by Mr. Harrison in the Coal Gas and Fuel Department of the University of Leeds, under the Chairmanship of Professor Smithells. Reference has previously been made to the gas heating research which you may remember was suspended in the year 1911. This work

has been highly beneficial, although at the time it was considered incomplete. When you have heard the report of the Ventilation Research Committee, I feel convinced that you will agree with me that the time is now ripe to continue gas heating research. This might be undertaken at the University of Leeds, along with ventilation research, under the title of "Ventilation, Gas Lighting, and Heating Research."

British Commercial Gas Association.

In the year 1911 this Association was formed, with the object of bringing prominently before the public the many and varied purposes to which gas can be put for domestic and commercial purposes. No one can say that the object has not been realized. In almost every paper or magazine of any importance published throughout the country, an advertisement of the British Commercial Gas Association meets the eye. Illustrated pamphlets on the uses of gas are published and distributed by the thousand, and it cannot be denied that a great deal of the present prosperity of the gas industry is due to the efforts of the Association.

The advertising, printing, and distribution of pamphlets cannot be done without expense; and I strongly appeal to the engineers of those gas undertakings that are not yet members seriously to consider the question, and advise their respective Committees or Boards to take their share in this forward movement. The Association are doing excellent work, and the stronger the membership the greater will be their efforts, and, naturally, the greater will be the benefits received by the gas undertakings throughout the country.

Sulphate of Ammonia Association.

A great amount of propaganda work has been accomplished in the past in this country by the Sulphate of Ammonia Committee in the publication of literature giving details of how to use sulphate of ammonia to the best advantage. The result of this work shows a greater sale of sulphate of ammonia for agricultural and horticultural purposes. It was thought advisable to couple with the propaganda work the sales of sulphate, and with this object the Sulphate of Ammonia Association was formed by the amalgamation of the Sulphate of Ammonia Committee and the Sulphate of Ammonia Manufacturers' Association. The Association, under the chairmanship of Mr. D. Milne Watson, are doing excellent work in advising the different gas undertakings as to the price to be accepted for sulphate when sold in this or other countries. Should the seller wish to secure a customer for his sulphate, the Association use their influence in finding one. The Association also periodically inform the subscribers as to the sales effected and the prices obtained.

As in the case of the British Commercial Gas Association, this work must have financial support. There may be gas engineers who are not subscribers, but who are at the present time receiving better prices for their sulphate through the efforts of the Association. The more publicity given to the advantages and uses of sulphate of ammonia for farms, small holdings, and gardens, the larger will be the sales, and the inevitable result better prices.

The Benevolent Fund.

The annual general meeting of the Benevolent Fund is to be held this afternoon. As the annual account showed a deficit, a special appeal was made to the members of the Institution who were non-subscribers to the Benevolent Fund. It is satisfactory to note that the response to this appeal has increased the funds by £61; and of this amount £35 was received in annual subscriptions. Many deserving cases have been considered by the Benevolent Fund Committee, and further support is urgently needed. Before closing my address, may I appeal to the members of the Institution to give further support to what I consider to be one of the most important branches of the Institution of Gas Engineers. I can assure you that the money you are willing to subscribe will be faithfully applied.

PERSONAL.

Mr. Robert Young, Gas Manager to the Youghal Urban District Council, has been appointed Manager and Secretary to the Parsonstown Gas Company. The Youghal Council, in accepting Mr. Young's resignation, paid generous tribute to his work.

Mr. D. U. R. Pearson, who last July secured the position of Works Superintendent to the Birkenhead Corporation gas undertaking, under the Engineer (Mr. T. Ormiston Paterson), has been appointed Assistant Engineer and Manager to the Oriental Gas Company's works at Calcutta, and will sail from England this month. Mr. Pearson, who was previously Chief Draughtsman at Birkenhead for five years, served his time with Messrs. Head, Wrightson, and Co., of Stockton, and was subsequently with the Whessoe Foundry Company, the Exeter Gas Company, Messrs. Ashmore, Benson, Pease, and Co., the Bradford Corporation Gas-Works, and Messrs. Newton, Chambers, and Co.

Mr. F. W. King, of the 1st/8th (Princess Beatrice's Isle of Wight Rifles) Hampshire Regiment, has—on the recommendation of his Commanding Officer—been awarded a commission as Second Lieutenant in the 11th East Surrey Regiment. In his nineteenth year, he had served for upwards of two years in the Isle of Wight Rifles. He is the only son of Mr. Frank King, the Secretary of the Newport (Isle of Wight) Gas Company. The latter served for thirty years in his son's late regiment, and occupied the position of Quartermaster for twelve years of the period—retiring in May, 1913, with the rank of Captain, and the privilege of wearing the uniform. Prior to his late regiment being mobilized, Lieut. F. W. King was with the Newport Gas Company, training for the gas engineering profession.

OBITUARY.

Mr. John Nicholls, of Pangbourne, for forty years Manager of the local gas-works, died recently in his 72nd year.

News was received last week of the death on the 17th ult., from wounds received in action in France, of Mr. Arthur Trewby, Temporary Lieutenant, Royal Engineers, youngest son of the late Mr. G. C. Trewby. Lieutenant Trewby was born in 1880, and educated at Highgate School and Pembroke College, Cambridge, where he took the Engineering Tripos. On Dec. 5 he received a temporary commission in the Royal Engineers.

Intimation has been received that Second Lieutenant Alan Menzies Hiller, only son of Mr. H. King Hiller, late Engineer to the Shanghai Gas Company, and now of No. 39, Victoria Street, was killed in action at Festubert, France, on May 16. He was 20 years of age (having been born at Shanghai in March, 1895), was educated at Berkhamsted and Cambridge, and at the outbreak of war last year was a member of the Officers Training Corps of the University. He joined the Reserve of Officers, and was gazetted to a Commission as Second Lieutenant in the 3rd Battalion "The Queen's" Royal West Surrey Regiment last August.

The death occurred on the 21st ult., at the age of sixty-seven, of Mr. James Broadhead, whose entire life-work was performed in the service of the Great Grimsby Gas Company. He entered the Cashier's department quite early, and eventually became the head of it; and he succeeded his father as Manager—a position he held till about seven years ago. He was at one time a member of the Eastern Counties Association, and was also a Freemason. He leaves a widow, two sons, and two daughters. One son (Mr. C. F. Broadhead) is the Engineer of the Brisbane Gas Company, having previously been Gas Engineer to the Middleton (Lancs.) Corporation; and the other, who has been employed at the Grimsby Gas-Works, has joined the Forces.

PROPOSED ASSOCIATION OF OFFICIAL INSPECTORS OF GAS-METERS.

At a general meeting of Inspectors of Gas-Meters appointed under the Sales of Gas Acts, which was held last June in the County Hall, Spring Gardens, London—Bailie Lyon, of Edinburgh, in the chair—a Provisional Committee was appointed, with Mr. G. Hume (City of London) as Chairman, to institute inquiries and to consider and report to a future general meeting upon the most desirable course to follow in bringing inspectors of gas-meters together for the discussion of all matters of interest to their profession. The object of the proposed Association is to procure, as far as possible, uniformity of practice in the administration of the Sales of Gas Acts, by means of meetings and discussions which will formulate opinion and encourage that understanding and mutual assistance which must be of real advantage to all.

The Provisional Committee met in London on the 20th ult., when the particulars obtained were considered. The Committee unanimously decided to recommend to the general meeting the formation of an Association of Inspectors of Gas-Meters, and expressed the opinion that the best means for carrying out this object would be the election of an Executive Council to draw up Articles of Constitution, and deal with matters arising, and submit the same for confirmation at the first annual general meeting, to be held on a date to be arranged by the Council, about twelve months hence.

The meeting at which the recommendations are to be considered will be held in London to-morrow (Wednesday).

IS THE INSTITUTION OF GAS ENGINEERS A FAILURE ?

By James Macleod, F.I.C.

In your able and searching editorial, "Official Municipal Targets," you state that one of your correspondents considers the time has arrived when a "Municipal Gas Engineers' Protection Society" should be formed; and this statement crystallized the intention long lying in my mind to ask the above question and ask it with as much publicity as I could—for, to my mind, no more damnatory indictment of the Institution of Gas Engineers could be made than that implied in your correspondent's idea.

What body should be able to protect the gas engineer if not the Institution? In what profession does the leading or parent Institution haggle or argue as what its duties are to its members, other than the Institution of Gas Engineers? Is there in any body of professional or semi-professional rank an Institution which has less to show in the way of achievement towards the welfare of its members? The answer is an emphatic negative.

The gas industry is over a hundred years old; the Institute or Institution is over fifty years old; and how does the industry stand over which the Institution spreads its ægis? Ask the man in the street how he places in his mind the electrical, the water, or the gas engineer. The answer is that, almost unconsciously, he places the gas engineer below the others, as a man of lower standing. Socially, then, the Institution has done nothing for the gas engineer.

Financially, how do gas engineers stand? The answer is that salaries are no better than they were many years ago.

Professionally, the Institution has failed even more dismally, as no recognized examination exists for the gas engineer; and he is without any special examination qualification for his position. One sees the Institution of Civil Engineers' examination recommended as a suitable one for the gas engineer to take. But I ask any one who has any experience of the gas industry, and of examinations, to glance at the syllabus of the final examination of the Institution of Civil Engineers; and if he can then honestly say that such an examination has other than a very indirect bearing on the gas industry, then I shall be much astonished.

Summing up the foregoing I hold that:

1. The Institution has failed to improve the social position of its members.
2. It has failed to improve the members' financial position.
3. It has failed to improve the educational position of its members, by failing to formulate an examination.
4. It has failed to provide a central building or meeting place for its members.
5. It has failed to open its doors to the best brains of the associated industries.

Let us glance for a moment at what has been achieved by a body one half the age of the Institution of Gas Engineers—viz., the Institute of Chemistry.

1. It has formulated an examination of considerable and growing difficulty.
2. It has just about completed a splendid, fully-equipped house of its own in London at the cost of close on £20,000; and this with a membership about the same as the Gas Institution.
3. It has so imposed its will on public authorities that it is now practically impossible for a man who is not a fellow or an associate to obtain a public analyst's appointment.
4. It has obtained its Charter.

The Institution of Gas Engineers again compares badly with the Institute of Electrical Engineers; but I need not labour this point.

It might be said so much for criticism; but what changes for the better have you to suggest? My answer is as follows:

1. Let the Institution make its strong representation to councils wherever and whenever injustice is shown to gas engineers.
2. Let the Institution appoint an Examination Board, and let the Board be really representative of the composite requirements of the gas industry—*i.e.*, let the Board contain a member drawn from the mechanical engineering side, the civil engineering side, the chemical engineering side, the accountancy side. There are representatives of all these holding gas engineering appointments; and there should be no difficulty in the matter.

Let there be no dead-heads awarded the examination qualification—not even the first lot of examiners.

As to the examination itself, let it extend over two days at least, and preferably three.

The examination, moreover, as in the case of the technological examination of the Institute of Chemistry, to consist of written work, including costing, drawing work, and *viva voce*. If I remember rightly, a dozen professional men assisted at the *viva voce*. Further, let the examination be freed from a good deal of the preliminary piffle of the examination of the Institution of Civil Engineers and the Institute of Chemistry; so that the young men of ability and grit in the industry may not be deterred by requiring to "swot up" a lot of stuff totally unnecessary for their future career. But make the examination stiff enough to be a real test, and make the degree of the Institution of Gas Engineers worth having. With an examination scheme formulated, a Charter for the Institution would not be long in forthcoming.

Then as to a home for the Institution, let a scheme be started in earnest. There are hundreds of men like myself who would willingly give an extra subscription for three or five years if need be to provide the Institution with a suitable house in London.

Until the gas industry has a special examinational qualification of its own, until it has a home of its own, and until it defends its members from unjust attack, I must regard the answer to the question at the head of this article as answered in the affirmative.

ELECTRICITY SUPPLY MEMORANDA.

In the "Memoranda" for April 13 last, particulars were given of a proposal to establish a bonus system for officers, staff, and men in connection with the highly successful electricity undertaking of the Poplar Borough Council, which is under the management of Mr. J. Horace Bowden. The undertaking has a lucrative district for industrial business. Hence low generating costs, and the ability to prove the success, in this case, of the principle of "small returns" producing "quick profits," or, in other words, a substantial aggregate profit. It has been one of the puzzles of the advocates of co-partnership as to how the workers in municipal trading concerns could participate in the profits according to their magnitude. Mr. Bowden has for his concern solved the problem up to a point. He is not the first in connection with a municipal department to produce a bonus scheme; but he is (with the Stafford Corporation) a pioneer with one that does not selfishly confine the bonus payment to the chief engineer and staff, as, we believe, is the case at Marylebone. It will be a pleasure to hear from Marylebone if this remark does an injustice to the practice adopted there. The Poplar scheme makes provision for all—from the highest to the lowest. But what it does not do (and this is where municipal proprietorship fails in connection with such schemes) is to bring into application and force the full advantages of co-partnership. There are no available means of enabling the recipients of the bonuses to become permanently incorporated as stockholders in the concern from which the bonus is derived, as there is in the case of joint-stock companies; and therefore the giving of the bonus stops short of ensuring a durable benefit to the rank-and-file, and to the undertaking by the personal part-proprietorship of the employees. However, this cannot be helped; and so the Poplar Electricity Department and Mr. Bowden have done the best they could in the circumstances. The scheme, we believe, is not looked upon favourably by the trade union leaders in the area. Trade union leaders are notoriously antagonistic to anything that hints at a stronger bond between employer and employed. Mr. Bowden, however, says that his object has not been to get one man to do two men's work, nor to "speed up" individual workers, but to create a feeling of individual responsibility among the men. If such a feeling is created, it must, and properly so, effect a speeding-up. It is, as he has pointed out to an interviewer, the little things that count in the operations of a trading concern. In the case of a stoker at the Poplar generating station, the saving of ⅛ lb. of coal per unit generated, reckoned on the output, would amount to £1800 a year. Therefore a stoker could, by being a little careless, increase the cost of fuel; but, when he appreciates that every ounce of coal he saves will help to increase his bonus, he is going to exercise care. This may be so in many cases; but there are always a few "don't-cares" among stokers as among other men, and these adversely affect the work of the "do-cares." The former want weeding out; and the bonus system may help to disclose them. It is interesting to learn that about 86 per cent. of the whole output of the Poplar station is for power; and that the average price for this business is now only 0·88d. per unit. One word as to the bonus for the officials and men of the Stafford Electricity Department. The payment on the wages is 14·6 per cent. for the past year, as compared with 12, 10, and 11·7 per cent. in the three succeeding years. The maximum for the department has been fixed at 15 per cent.

Municipal Bonuses.

Mr. J. F. Shipley, who is engaged by the Electrical Company, Limited, of No. 122, Charing Cross Road, W.C.—a firm who, we believe, among other things, sell electric-irons—will in future be very careful that he has at his command the exact facts of the case before he makes statements in public of a slanderous nature which may do considerable harm to a commercial undertaking, and that trading under statutory authority. He ought, in fact, to consider himself very lucky that he had to deal with such a generous management as there is at the head of the Luton Gas Company. The statement in question was made at the meeting of the Junior Institution of Engineers in April, on the occasion of the reading of the paper by Mr. Stanley M. Hills [see "Memoranda" for April 20, p. 130]; and

Mr. Shipley's False Statement.

"Electrical Industries" gave the false assertion circulation in these terms:

> The discussion did not add very much of value to the paper; but we may note Mr. J. F. Shipley's account of how the installation of 200 gas-irons in a Luton straw hat factory led to ten or twelve cases of gas poisoning daily. It is astonishing that the girls who had thus to be treated in the factory hospital did not realize the true relation between gas fumes and ventilation.

This was a serious allegation, and might be—perhaps has already been—used to the detriment of the gas industry—not only in Luton, but elsewhere. The General Manager of the Luton Gas Company (Mr. W. R. Phillips) determined that, in the interests of his own concern and those of all other gas undertakings, the circulator of the falsehood should be compelled to withdraw it, or suffer the consequences of a refusal by being supplied with an opportunity for trying to show that "falsehood" is not a proper descriptive term for what he said. From what we understand, Mr. Shipley did not at the outset seem to grasp the awkward situation which he was in; and his first reply to a letter from the Luton Gas Company appeared to indicate the view that a curt dismissal of the subject would suffice. In a few words, he relegated the terrible succession of "gas poisonings" to a period somewhat remote from the present, and ended by saying: "I am unable to discuss it further." But it happens that the question of the dismissal of the subject did not rest with Mr. Shipley. The Luton Gas Company was affected, and their business with the straw-hat factories of Luton stood a chance of being gravely injured by a slanderous allegation.

The Withdrawal.

However, a further letter brought Mr. Shipley to a nearer appreciation of the serious trouble to which he had exposed himself, and which was all the worse because the assertion was made at a meeting some of the individuals present at which have no doubt already had their say among their friends regarding the supposed poisonous fumes that emanate from gas-irons. Mr. Shipley then shifted his ground, and accused his memory of having betrayed him as to the place where the terrible gas poisoning experience with gas-irons took place; and he privately offered regrets and a full apology for having made the careless mistake. But in a letter subsequently published by him in "Electrical Industries," there was no apology or expression of regret; but simply a withdrawal of the statement. It read:

> In your issue of April 21 (p. 425), you report my remarks about an installation of gas-irons. I said that the factory I had in mind was at Luton. But I find this is not the case; and as my misstatement may cause injury to the interests of the Gas Company of that town, I should be obliged if you would publish this in order to correct my mistake.

Less, under the circumstances, could not have been said. The letter was altogether inadequate; and it would not have hurt "Electrical Industries" to have also expressed regret that it made itself the vehicle for the dissemination of the falsehood. We think the Luton Gas Company might well have demanded prominence being given to an expression of regret on our contemporary's part equal to that it was pleased to accord to Mr. Shipley's allegation. However, the towns outside Luton in which there are straw-hat factories one of which would require 200 gas-irons are not numerous; and we challenge Mr. Shipley to again tax his memory, and say out boldly which town it is in which the factory is situated. He has nothing whatever to fear—providing he can prove his assertion that the use of the 200 gas-irons "led to ten or twelve cases of gas poisoning daily." If he cannot give the name of the town, and cannot prove his statement, then let him say so outright as a man. In more than one electrical quarter, regret has been privately expressed that Mr. Shipley should have given publicity to the statement over which the General Manager of the Luton Gas Company had just cause for complaint. There is one man who will in future be sure of his ground before making slanderous statements about gas, and that is Mr. Shipley. One question in conclusion. If straw-hat factories in Luton can use a large number of gas-irons without "ten or twelve cases of gas poisoning daily," why should not straw-hat factories elsewhere? Perhaps Mr. Shipley and "Electrical Industries" will both reply to this question.

Bedroom Heating in Hotels.

If one took seriously some of the arguments of our electrical contemporaries they might fairly be regarded as incontrovertible evidence of mental depravity on the part of the writers. One favourite form of their polemical procedure is to endow the gas-fire with all the demerits of the coal-fire; yet it does not require the intelligence of anyone in higher position than the office boy of an electrical engineer or an electrical journalist to appreciate the marked difference between the barbarous form of heating by the combustion of coal and the scientific method of heating by the radiation of "fuels" made incandescent by the combustion of a purified gas. In the new Regent Palace Hotel at Piccadilly Circus, it has been decided, so the "Commercial Section" of the "Electrician" tells its readers, to introduce 1½ K.W. electric-"fires" into the bedrooms, and the sleeping and breakfast tariff is to be inclusive of this accommodation. In the electrical comments on this innovation, it is stated that "the coal fire and the gas-stove introduce, in the first instance, difficulties in the way of attention, and in the second difficulties with flues. In both cases the management can only sanction their use by an extra payment. The electric-'fire' does not suffer from any of these disabilities." How marvellous! and how intelligent! What "difficulty" does the gas-fire occasion in the way of attention from the user? He turns the tap, and lights the fire. There is nothing else to be done until it is extinguished, or the consumption of gas is reduced when the temperature of the room is at a comfortable degree. Again, what flue difficulties are created with the gas-fire? If the flue is capable of performing its destined functions, there is no flue difficulty whatever with the gas-fire; on the contrary, the two combined efficiently assist the ventilation of the room. The electric-"fire" cannot do this. Then the management can only sanction the use of coal and gas fires by an extra payment. For the electric-"fire," the management of the Regent Palace Hotel has included something in the tariff; the astute gentlemen at the head of the Company running this enterprise would surely be insulting their own famous business acumen if they had not done so. If they can make a charge inclusive of an electric-heater, they can do so equally well for a gas-fire. There is nothing whatever to prevent it—save one thing with which we will deal in the next paragraph. It is hinted in the article that this installation is looked upon as being "something of an experiment;" and it is clothed with "the distinctive psychological advantage [!] of placing the patrons of the establishment quite at their ease—they feel that they are being catered for on an inclusive basis." Again—how marvellous! We are not so sure about people being placed at their ease by the use of the electric-heater, although included in the hotel room-*cum*-breakfast terms. In the depths of the winter heat, and plenty of it, is needed; and electric "fires" have a bad name for effective heating, in any but small rooms, at the very season of the year when most required. About the inclusive charge, 1½ kilowatt-hour radiators, and 1000 odd installed will mean a substantial electricity bill for heating; and the maintenance of these radiators will also put before the management an extensive account. Nevertheless we do not see that the management are going to make any difference in the tariffs for their summer and winter patrons. This is not fair. As things stand, it means that the summer residents, paying the same as the winter ones, will be helping to discharge the winter heating and maintenance accounts for the 1½ K.W. radiators. Naturally, our contemporary hopes that other hotel proprietors will become eager to follow this lead. Other hotel proprietors will want to know something of the over-all cost before committing themselves.

No-Flue Rooms and Cubical Capacity.

It is safe to say the Gas Light and Coke Company did not let this heating installation slip without making a very good effort to secure it. Of course, there is a reason for the choice of electric-"fires" for these 1000 odd bedrooms; and the reason will probably not commend itself to all people who are concerned with hygienic conditions in their sleeping apartments. One thing is missing from the editorial article in our contemporary; and it is that the cubical capacity of the sleeping apartments in the hotel is not mentioned, nor is the fact stated that there are no fireplaces or flues in the rooms. It is remembered now that in the "Pall Mall Gazette" in July last year, Mr. A. H. Seabrook put forward the view that rooms should henceforth be constructed without fireplaces and flues—for, we take it, the benefit of electric heating, and not for the health of the occupants. One of the several letters which Mr. Seabrook brought down on his electrically devoted head, was from Mr. David Isaacs, of Berners Street, who wrote:

> There may be some building owners sufficiently foolhardy to erect flats without chimney flues and open fireplaces; but as an estate agent of many years' experience, who has had dealings with some of the principal blocks of flats in the West-end, I certainly would not, if I could help it, permit any building owner client of mine to leave them out—the risk being obvious. Apart from a well-designed open fireplace being ornamental and attractive, its hygienic value from a ventilating point of view is incalculable and although some of the flats with which I have been connected have steam-radiators (which are so much more effective than electric) in the rooms, no client of mine has yet taken the risk of deleting open grates.

Therefore Messrs. Lyons and Co. are making an experiment with these bedrooms, and are taking a risk. Time alone will show what the public think of it—a public who are not disposed to confinement in small flueless apartments throughout the night—electric radiators notwithstanding. It would seem that in the design of the hotel, one end in view has been to get as much sleeping accommodation as possible, and this has been the main question with the Company, and not that of "Gas Heating *v.* Electric Heating." As a matter of fact, Messrs. Lyons and Co. are excellent patrons of gas. In the kitchens of the new hotel, a considerable quantity of gas-heating apparatus is being installed. In the New Strand Corner House, nothing but gas and gas coke are employed by them in the kitchens; their experience of all kinds of heating for large-scale culinary work being extensive. We believe it would be found not far from the mark if we said that, computed at present prices, Messrs. Lyons and Co. consume gas for cooking purposes in London to the extent of something like £25,000 or £26,000 a year. The installation of electric "fires" at the new hotel is therefore due not to their heating efficiency, but to structural circumstances.

ASSISTING THE MANUFACTURER.

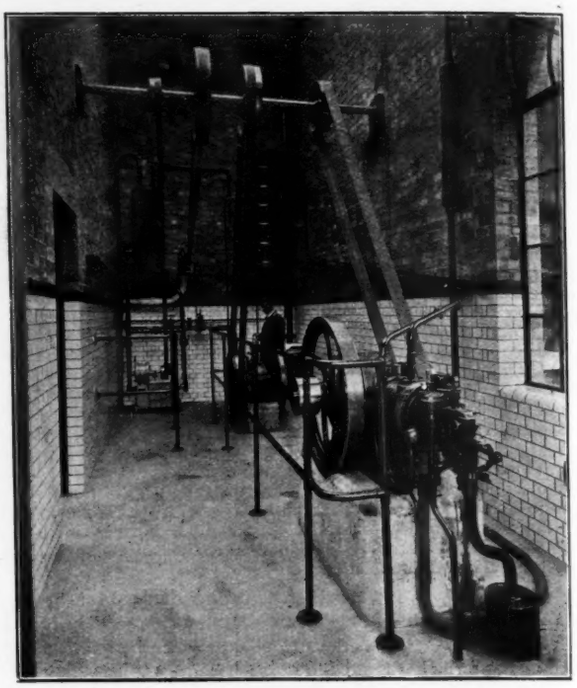
The Gas Light and Coke Company's Demonstration Room.

THANKS to the publicity methods which have been so successfully adopted, there is far less excuse now than was the case at one time for anyone to be ignorant of the many uses for which coal gas can be advantageously employed in industrial processes; and thanks also to the great ingenuity displayed by inventors and makers of gas appliances the number of these uses is being continually extended. The placing of this knowledge before a manufacturer, in the shape of facts and figures, however, may not always be sufficient of itself to secure a new customer for the undertaking; and in such a case the expert representative of the gas company finds his task immeasurably simplified if he can say, "Come along with me, and I will show you just what gas can do for you." By an actual working test, doubts can be brushed aside, the correctness of claims be proved, and additional data be secured on any point which may need to be cleared up.

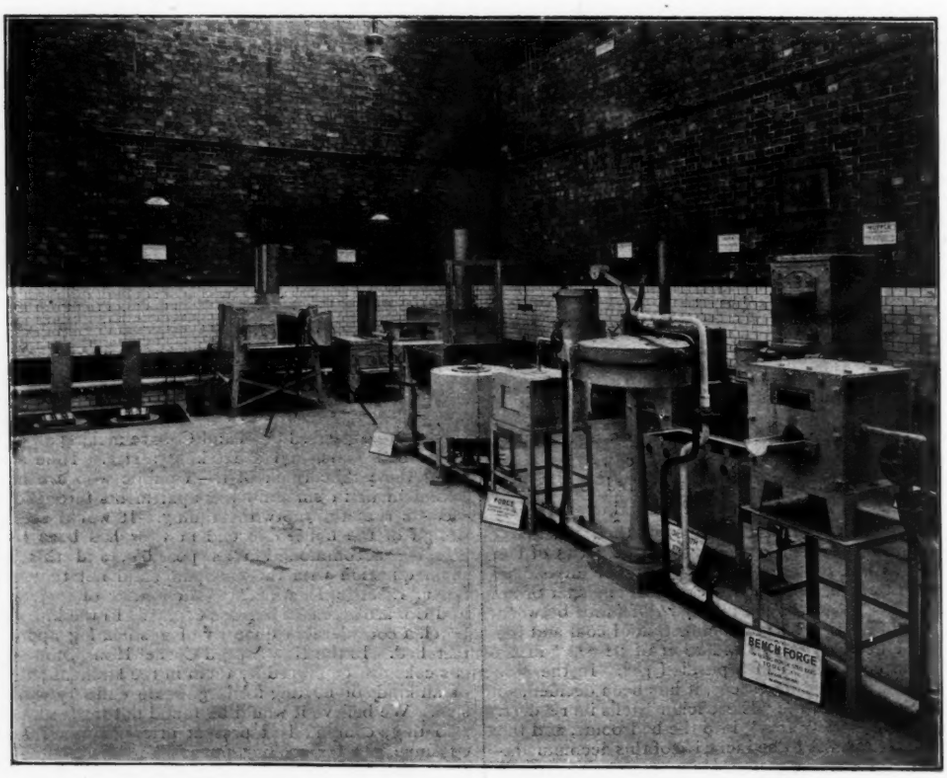
A vast amount of useful work in this way will be done in the new demonstration and experimental room which has been recently opened by the Gas Light and Coke Company at their City depôt, No. 146, Goswell Road, for the service of the rapidly increasing number of manufacturers desirous of considering the use of coal gas as a fuel in their factories and workshops. Something of the kind has, of course, previously been done, on a much smaller scale, at this depôt, which is excellently situated for the purpose, serving as it does one of the principal manufacturing divisions of the Company's area; and probably it was, to some extent, the success which attended these earlier efforts that led to the carrying out of the larger scheme. Be this as it may, the idea is an excellent one; and it has been thoroughly well carried into effect. How conveniently everything has been arranged was seen last Friday by a large party of Press representatives who, on the invitation of the Directors of the Company, inspected the building, and had matters explained to them by Mr. F. W. Goodenough (the Controller of Gas Sales) and members of the staff.

The party found themselves in a building which consists of two communicating rooms, in which substantial height, good roof and window lighting, and white tiles combine to show everything at its best. The furnace-room measures some 40 feet by 30 feet, and the adjoining power-house 10 feet by 30 feet. The latter, of itself, forms quite a useful exhibit, as showing the small amount of space that need be occupied, and of machinery to be installed, to secure a supply of high-pressure gas or air. In this room, there is a Worthington compressor, which will furnish gas or air at from 8 to 20 lbs. pressure, a Keith-Blackman compressor that will give air or gas at from 2 to 4 lbs., and also a Keith-Blackman high-pressure air fan supplying at from 4 to 8 inches. These are all driven by a 6 B.H.P. Hornsby-Stockport gas-engine. Thus, by means of supplies conveyed through pipes painted in different colours, experiments and demonstrations can be made with high-pressure gas, high-pressure air, low-pressure gas, and low-pressure air; so that any combination can be dealt with. It has been a good idea, too, to take full advantage of the ample opportunity afforded by the dimensions of the furnace-room to make a representative display of high and low pressure lamps specially suitable for factory lighting. These include specimens of Keith high-pressure, Sugg self-intensified, and "Nico," Bland, "Pop," and other descriptions of low-pressure lights. Everything, from the two 200-light meters to the furnaces themselves, is in full view; so that the customer, or prospective consumer, can fully satisfy himself on all points. Better, however, than any description of the place will be the accompanying photographs by Messrs. John H. Avery and Co., of Hillmarton Road, N.

As to the furnaces themselves, these number perhaps forty, arranged without any suggestion of crowding round the walls and down the centre of the room. There is no need here to refer to them in detail; it will suffice to say that they include some of



The Power House.



A VIEW OF THE GAS LIGHT AND COKE COMPANY'S FURNACE ROOM.

the best-known specialities of Messrs. Fletcher, Russell, and Co., the Richmond Gas Stove and Meter Company, and Messrs. John Wright and Co. Generally speaking, the trades to be catered for in London are not very big ones; and so the furnaces likely to be most in demand are those suitable for the smaller operations. Those now to be seen at Goswell Road include, in great variety, boilers, crucibles, furnaces, muffles, ovens, blow-pipes. Among the things attracting attention were a special design of sugar boiler, and an internal heater suitable for heating soft metal, boiling liquids, &c.

In addition to the actual gas-heated appliances, a number of samples of products were exhibited, in which the visitors took much interest. These included Wolfram ore, roasted by gas, for the production of pure tungsten required for the manufacture of high-speed steel; and cavalry horse-shoes, of which some 10,000 are being turned out weekly by the aid of gas-heated forges. Then there were to be seen button-stampings (annealed and blued by gas), which formerly came from Germany; varnish, made in gas-heated furnaces, which also before the war was largely imported from the same country; and several brilliant colour materials, dried and decomposed by gas, which previously came from German sources. These are, of course, only a very few from among the very many processes cited in which, because of its convenience, cleanliness, labour-saving capacity, reliability, and ultimate economy, and its power to increase and improve output per square foot of floor space, gas is rapidly displacing solid fuel. The wide range of these processes, it will be recalled, formed the subject of a paper read by Mr. H. M. Thornton before the Royal Society of Arts some weeks ago [*see* "JOURNAL" for March 23, p. 743].

The new experimental and demonstration shop at their Goswell Road depôt should prove a busy place, and a profitable one to the Company by whose enterprise it has been erected.

COKING AND BYE-PRODUCTS.

By "Event and Comment."

Supplies of Sulphuric Acid.

The position with regard to supplies of sulphuric acid is apparently as acute in Germany as in this country. As reported in the "JOURNAL" last week, on account of the shortage of sulphuric acid, certain works are now having to work-up their own ammonia either as concentrated gas liquor or as strong ammonia. One is inclined to think, as a result of careful personal observation, that in this country at any rate the scarcity of sulphuric acid is not real, but has been created by the acid ring. It is, of course, admitted that the abnormal demand for explosives has resulted in a correspondingly abnormal demand for heavy acids, particularly sulphuric and nitric. This is bound to react on the general trade requirements for these commodities. For the manufacture of sulphuric acid, either nitric acid or its equivalent of sodium nitrate is required; while for the manufacture of nitric acid, sulphuric acid and sodium nitrate are required.

Only one or two sulphuric acid plants working on the contact system—*i.e.*, without the employment of nitric acid or nitrate—are in operation in this country, and they are chiefly engaged in producing strong or Nordhausen sulphuric. There is no apparent reason, therefore, for the exorbitant prices being charged for the acid at the present time, and producers will only get what they deserve if they lose the custom of coke-oven people when the war demand has ceased to exist. The writer has urged before, and would do so again, the expansion of bye-product coking operations to include the manufacture of sulphuric acid within their sphere. There is a growing demand for purified gas or coke-oven plants, more especially in cases where the gas is consumed in gas-engines. Oxide purification as practised on gas-works is effective, and is simple and comparatively inexpensive both with regard to capital cost and working expenses. The sulphur so recovered will go a long way towards meeting the needs of sulphuric acid plant of suitable size for the works. Consider, for example, a coke-oven plant carbonizing (say) 500 tons of coal per day and yielding 1·5 per cent. of sulphate of ammonia. The usual acid employed on coke-oven plants is brown oil of vitriol of a strength of about 144° Twaddel; and of this, approximately 1 ton is required for every ton of sulphate made. Thus the daily requirements on a plant such as is indicated would be 7·5 tons of acid per day of 24 hours. Allowing a margin of 20 per cent. for stoppages, &c., a production of 9 tons of acid per day would be required. To make this amount, a compact plant on the tower system could easily be erected and worked economically. For this purpose, approximately 2·4 tons of sulphur would be required, most of which could be recovered from the coke-oven gas. It would perhaps be necessary to carry a small stock of pyrites, or spent oxide, from another source; but there would undoubtedly be a considerable saving to any plant undertaking the manufacture of its own acid. The newer tower systems for the manufacture of sulphuric acid are a great improvement on the old chamber system. With the latter, about 20 cubic feet of chamber space are required per pound of sulphur burnt per 24 hours; while in the case of the tower system, this is reduced to 4 or 5 cubic feet. The difference is largely accounted for by the fact that the towers are packed with glass or acid-resisting brick, thus considerably increasing the contact surface inside the towers. It is also becoming more customary to use nitric acid, instead of sodium nitrate, to supply the necessary nitrous gases. Mechanical burners are also now available for dealing with all classes of sulphur materials, and especially for spent oxide. The supervision required for such a plant is comparatively simple; and the whole process of manufacture is easy to control.

Ammonia Compounds.

The difficulties with regard to sulphate of ammonia, as outlined above, are causing producers to turn their attention to the possibilities of manufacturing other ammonia compounds. Concentrated ammoniacal liquor, corresponding to a strength of about 15 per cent. ammonia, is attracting some attention. From the purely technical point of view, this is one of the most attractive propositions, as there are no special difficulties involved in the process of manufacture. In most cases the liquor is sold at so much per cent. of ammonia, with a fixed minimum and maximum strength. As a rule, there is no stipulation as to sulphuretted hydrogen or carbon dioxide content; the only requirement being that the whole of the ammonia shall be free and not fixed—*i.e.*, that fixed ammonia is not paid for. The sulphuretted hydrogen, of course, can be used for the ultimate production of sulphuric acid. As long as there is no restriction in this respect, the process of manufacture is simple. If, however, sulphuretted hydrogen has to be eliminated and also the carbon dioxide, this involves considerable purification plant; and the writer would not recommend anyone to undertake the manufacture of concentrated liquor of this character without having some experienced person to take charge of the plant. If pure liquor ammonia has to be produced, still further purification is required. The question of demand for the product must also not be lost sight of. The demand is fairly constant in normal times; but it must be remembered that hitherto the market has been in the hands of a few large firms who strongly resent intrusion, and are inclined to "cut" prices in order to squeeze-out a possible competitor.

The same reasoning applies to some extent in the case of other ammonium compounds. Ammonium chloride is being manufactured in many coke-oven plants where the hot, direct recovery processes are established. Perhaps the principal difficulty with processes of this type is the recovery of the fixed ammonia salts, the bulk of which is ammonium chloride; and unless it is recovered as such, certain difficulties and complications are introduced. Ammonium chloride recovery is a profitable process; but the demand for this product is not extending as fast as the manufacture, and hence there is a danger of over-production. Again, this product can be produced cheaply on coke-oven plants on account of the fact that no external hydrochloric acid is required; evaporation and clarification only being necessary. Although the evaporation of ammonium chloride solution is troublesome, it can be done economically and satisfactorily. If, however, external acid has to be bought, the cost of manufacture will increase very much, with corresponding decrease in the profits realized.

Ammonium nitrate is, of course, in great demand at present, as it forms one of the principal constituents of many explosives. The same difficulty exists here, however, as with sulphate—*i.e.*, the supply of the acid required. If nitric acid itself is not used, some soluble nitrate must be employed, and these are urgently required for the manufacture of the acid. Other ammonium compounds are comparatively unimportant commercially, and offer no attractions to coke-oven people. There is, therefore, great incentive for the development of a real direct process—that is, one in which the sulphur in the coal is utilized instead of external sulphuric acid.

The Clarkson Coke-Fired Lorry.—The utilization of coke for raising steam for road motors is dealt with in the current number of the "Engineer," in an illustrated article describing the Clarkson coke-fired steam-lorry, of which a plan and an elevation are given on a large plate.

Recent Wills.—The late Mr. John Carter, of Lincoln, left estate of the gross value of £3941, of which £1291 is net personalty. The late Mr. T. S. Clapham, of Keighley, whose death was recorded in the "JOURNAL" for the 23rd of February last, left estate of the gross value of £7193.

Journal des Usines a Gaz.—We have received the first number of this publication for the current year. It covers the period from the 1st of January to the 31st ult. The contents include a "Roll of Honour" for the French gas industry, a report of a special meeting of the Société Technique du Gaz, held early in April, to receive the report of the Committee and pass revised rules, and a statement by the Central Coke Committee in regard to the position of the coke industry in France as the result of a study of the judicial aspect of the subject. The coal question occupies a prominent position in the number. The Professional Syndicate have taken up this matter, with the result that an organization has been formed for the purchase of English coals in common for gas undertakings. Reference is made to the editorial article on "The Scandal of Coal Prices" which appeared in the "JOURNAL" for April 6, and translations are given of it and of the abstract of the report of the Commission in the same issue. In regard to the former, our contemporary simply presents a literal translation of the article, leaving with us the responsibility for the "forcible expressions" employed therein.

FACTORY LIGHTING BY HIGH-PRESSURE GAS.

Additions to Mr. Broadberry's Paper before the Eastern Counties Association.

It will be remembered that at the recent meeting of the Eastern Counties Gas Managers' Association, Mr. A. E. Broadberry described some recent installations of Keith and Blackman high-pressure gas for factory lighting [*ante*, p. 271]. He illustrated his paper by a number of slides prepared from photographs taken by Messrs. John H. Avery and Co., of Hillmarton Road, N., some of which were reproduced in the "JOURNAL." We are now able to supplement them by others, and to give the particulars regarding the installations which Mr. Broadberry furnished on the occasion referred to.

MAIN WORK-ROOM AT MESSRS. BEDFORD, STEER, END, AND CO.'S.

The following particulars relate to an installation in the main work-room (No. 5) at the factory of Messrs. Bedford, Steer, End, and Co., wire workers, of Long Lane, Bermondsey, where the Keith high-pressure gas lighting was installed in place of low-pressure incandescent gas lighting and flat-flame burners. It consisted of—

2 lamps of	60-candle power			
41 ,,	100 ,,	,,	Total, 16,370 c.p.	Cost, £125.
71 ,,	150 ,,	,,		
5 ,,	300 ,,	,,		

The following are the figures of gas consumption, extracted from the meter-book:

Christmas quarter, 1913	227,200	cubic feet.
,, ,, 1914	156,600	,, ,,
Difference	70,600	cubic feet.
Lady Day quarter, 1914	222,600	cubic feet.
,, ,, ,, 1915	152,000	,, ,,
Difference	70,600	cubic feet.

The saving in the two quarters was 141,200 cubic feet, costing, at 2s. 4d. per 1000 cubic feet, £16 9s. 6d.

The following are the readings:

	Foot-Candles.	
No. 1 machine, on working surface, 3 feet from lamp	14·8	Not helped by other lamps.
Inspection space	13·2	
No. 2 machine on working surface	16·5	Helped by other lamps.
Inspection space	15·0	
Middle of gangway on floor	2·25	

The subjoined particulars furnish an interesting comparison of electric and gas lighting at the offices of the "Field" newspaper. They refer to the lighting of four double frames by eight 16-candle metallic filament lamps in one case, and of two 150-candle high-pressure lamps in the other. The photographs were taken in separate rooms.

Electricity.

Eight 16-candle 20-watt lamps = 160 watts, and taking an average between 3d. for lighting and 1·75d. for night lighting—2·37d. per unit—the cost per hour is . . . 0·38d.

Gas.

Two 150-candle Keith high-pressure lamps, at 2½ cubic feet per lamp per hour, = 5 cubic feet per hour, with gas at 2s. 10d. per 1000 cubic feet, the cost would be. . . . 0·17d.

The foregoing figures show a saving of 55 per cent. in favour of gas, while giving nearly 2½ times the illumination.

The following are the readings taken on the 15th of April:

Gas Installation.

Compositors' cases—

Spacing of lamps, 6 feet—*i.e.*, from case to case; from lamp to centre of case, 3 ft. 3 in.

		Foot-Candles.
(1)	Reading taken directly under case, 2 ft. 6 in. from lamp	20·0
	Do. on letter "e" box	10·5
(2)	Do. directly under case, 2 ft. 6 in. from lamp	20·5
	Do. on letter "e" box	11·0

Imposing stones—

Reading taken under lamp, 3 feet from source	18·0
Do. at right end of stone	7·5
Do. directly under lamp	20·5
Do. at left of lamp, approximately 45°	12·0
Do. at right of lamp	10·0
Do. on floor	4·5

Electric Installation.

Imposing stones—

Each 1 ft. 10 in. from surface, two lamps to a stone.

	Foot-Candles.
Reading taken under No. 1 lamp	10·0
Do. under No. 2 lamp	5·0
Do. between the two lamps	7·0

Two 4 ft. 9 in. centres.

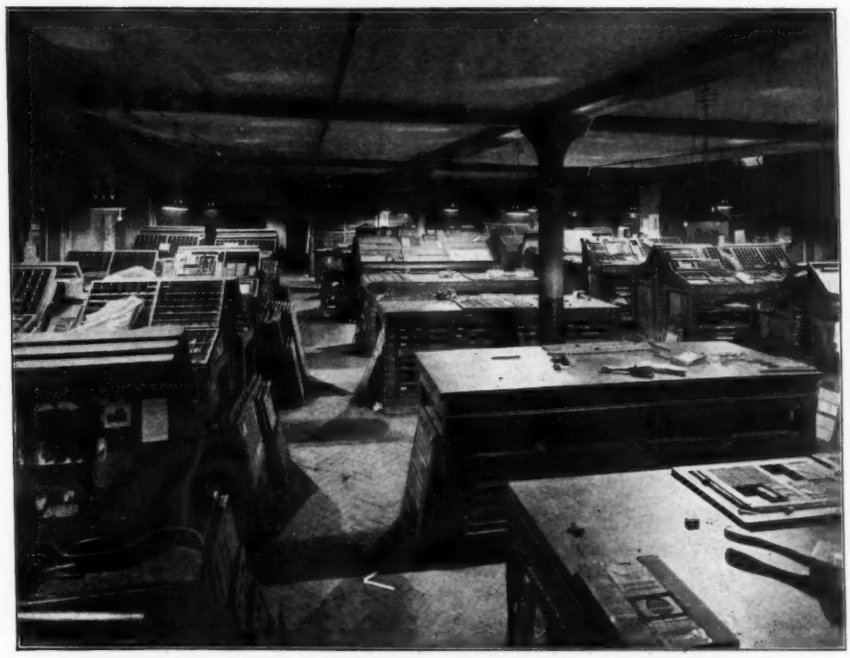
Reading taken under No. 1 lamp	7·0
Do. under No. 2 lamp	2·0
Do. between two lamps	8·5

Readings taken on four double frames lighted by eight electric metallic filament lamps 3 feet apart, distance from letter "e" box 1 ft. 8 in.:

	Foot-Candles.
Under one lamp	11
Under adjacent lamp	6
Midway between the two lamps	6
Over letter "e" box	6

The following are some random readings (in foot-candles): Frames, 7·25, 8·5, 6, 7; on floor, 1·2.

The following particulars relate to an installation in the capstan shop and the stamping-machine shop at Messrs. D. T. Jackson and Co., Army equipment makers, Gainsford Street, Tower Bridge. The figures for the high-pressure gas installation of the whole of the new building are given. In the case of the stamping-shop, local lighting is not required, as the machines when once set work automatically. A good general illumination is all that



GAS-LIGHTED COMPOSING-ROOM AT THE "FIELD" NEWSPAPER OFFICES.

ELECTRIC LIGHTED COMPOSING-ROOM AT THE "FIELD" NEWSPAPER OFFICES.

is required, in order to see metal on the floor, &c. Therefore lamps of considerable power are set high, and shallow shades are used. In the case of the capstan shop, deep shades were used to concentrate the light on the working points.

	Candle Power.
110 lamps of 300-candle power	33,000
3 ,, 150 ,, ,,	450
12 ,, 100 ,, ,,	1,200
Total	34,650

Gas consumption per hour, with all lamps on (580 cubic feet)	1s. 6d.
Charge for "B" size compressor, at 1d. per unit.	0 0½
	1s. 6½d.

The following are the readings:

Capstan Shop (*No.* 3).

	Foot-Candles.
Vice-bench on right—	
Light on vice 18 inches from centre and 3 feet from lamp	18·0
Do. between lamps	13·0
Do. on lathe	8·5

Stamping-Machine Shop (*No.* 4).

Cutting edge of guillotine	1·2
General illumination at working height.	5·5 to 7·0
On floor	4·0

The following particulars relate to the installation at the factory of Messrs. Hobson and Sons, Army clothing contractors, Tooley Street, S.E., an illustration of which, showing gas and electricity, has already been given in the "JOURNAL" [*ante*, p. 276]. The photo. shows the test-room on the first floor:

Electricity.		*Gas.*	
24 30-watt Osrams	720 watts	28 150-candle Keith high-power lamps, taking 70 cubic feet per hour.	
4 16-c.p. carbons	320 ,,		
	1040 watts		
Total nominal illuminating power	784 candles	Total nominal illuminating power	4200 candles
Cost for 10 hours (10½ units, at 5d.)	4s. 4½d.	Cost for 10 hours (700 cubic feet, at 2s. 4d.)	1s. 8d.

These figures show a saving of 2s. 8½d. in 10 hours in one room.

CAPSTAN SHOP AT MESSRS. D. T. JACKSON AND CO.'S.

STAMPING-MACHINE SHOP AT MESSRS. D. T. JACKSON AND CO.'S.

The following are the readings for the two sides of the room :

Side Lighted by Electricity.	Foot-Candles.
Under lamp	6·7
Between lamps	2·2
Needle plate	3·9
	Ft. In.
Height from bench	1 9
Spacing	3 3
Distance from needle plate	2 3

Side Lighted by Gas.	Foot-Candles.
Under lamp	13·0
Between lamps	8·5
On work (on knee)	6·1
Do. between lamps	5·9
	Ft. In.
Height from bench	4 0
Spacing	4 6

On reference to the photo. it will be seen that the electric lamps were hung very low, so that the light shone directly into the eyes of operators.

Exhibition of Industrial Furnaces at Newcastle.—An exhibition of industrial furnaces (under the auspices of the North-East Coast gas undertakings) was opened yesterday in the Old Infirmary, Newcastle-on-Tyne. It was announced that the exhibition would be inaugurated by the Rt. Hon. the Lord Mayor of Newcastle-on-Tyne (Alderman John FitzGerald), under the chairmanship of Sir William H. Stephenson, D.C.L., D.L. The opening was to be followed by a brief statement by Mr. S. N. Brayshaw, and a practical demonstration of furnaces and heat treatments.

Papers for the International Gas Congress.

According to a statement recently made by the Secretary of the Joint Committee on the International Gas Congress in connection with the Panama-Pacific Exhibition (Mr. George G. Ramsdell) as reported in the "American Gas Institute News" for last month, Mr. Charles Carpenter, D.Sc., will present a paper, and so will Mr. Edward Allen, the delegate of the Institution of Gas Engineers. The subject of Mr. Carpenter's paper was not known at the time the remarks were made; but Mr. Allen's is "A Review of Present Practices in the Manufacture and Distribution of Gas by British Undertakings." A paper will be presented by Mr. C. O. Bond, representing the American Illuminating Engineering Society; also one on "Modern Coal-Gas Processes," by the Society of Gas Engineering of New York. There will be a symposium on the commercial side of the business from the National Commercial Gas Association of America. A paper will be submitted on "Oil Gas," by Mr. Leon Jones; and one on "The History of the Development of Water Gas," by Mr. J. A. P. Crisfield, of the United Gas Improvement Company. Mr. W. D. Ryan, who has charge of the subject of illumination, will give a description of the Exhibition lighting. This completed the list at the time Mr. Ramsdell's remarks were made; but it was expected that other papers would be added.

GAS-HEATED FURNACES FOR INDUSTRIAL PURPOSES.

Under the auspices of the Leeds Corporation Gas Department, a lecture on "Gas-Heated Furnaces: Their Application for Industrial Purposes and the Manufacture of War Materials," was given last Thursday by Mr. E. P. TAUDEVIN, of the Richmond Gas Stove and Meter Company, Limited, at the Hôtel Métropole, Leeds. The chair was occupied by Mr. A. L. RINTOUL, the President of the Institute of Mechanical Engineers, a large number of the members of which body attended. At the close of the lecture a discussion ensued, when Messrs. Blackburn, Towler, Wilson, Hartnell, Rainforth, and others raised several points which were of considerable interest to those present. The application of gas-furnaces in the preparation of munitions of war appealed to the hearers, inasmuch as at the present time a committee for the manufacture of shells and other munitions is busily engaged in working-up the resources for the production of these materials.

After a few introductory remarks, in which the lecturer said he felt it a privilege to bring under the notice of the Institute a few facts about gas-furnaces, and their application, he expressed the hope that he would be able to show that their field of usefulness extends beyond the tool-room, and that in Leeds there is large scope for furnaces for annealing, case-hardening, re-heating, brass-melting, and numerous other industrial heating operations. He pointed out that quite recently a paper was read by Mr. H. M. Thornton, before the Royal Society of Arts,* giving a very complete review of the large number of industrial operations for which town gas is now being used. The lecturer divided his subject into two sections: (1) The design of gas-furnaces; (2) the application and some illustrations of their present usefulness in the production of war materials.

DESIGN OF GAS-FURNACES.

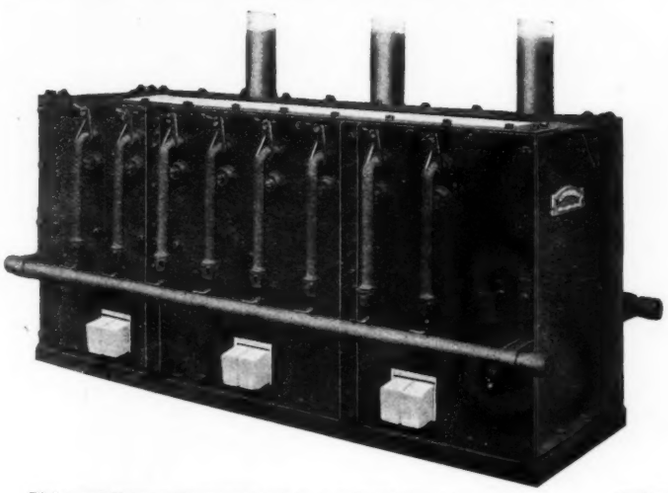
It would be a mistake to assume that one particular type or design of gas-furnace is of universal application. A furnace that can be used for any kind of operation is probably not much good for any one of them. We must discriminate, and experience has shown us that the more useful types may be divided into three distinct classes: (*a*) Natural draught regenerative furnaces, which may, in the great majority of cases, be used for temperatures up to 800° C. or thereabouts, and in some cases above; (*b*) furnaces with gas at low pressure and fan blast, suitable for temperatures between 800° C. and 1400° C.; and (*c*) low-pressure gas and air blast or high-pressure gas, for small furnaces where high working temperatures are required in a restricted furnace chamber.

For the light operations of re-heating gears and suchlike work, this furnace will be found to be most satisfactory. Up to quite recently—notably in America—gas with air blast was exclusively used for low temperature work; but there are self-apparent objections why gas with air blast should not be employed for low-temperature work in oven furnaces. If a temperature of 750° C. is to be maintained in an oven furnace, say 3 feet deep by 2 feet wide by 1 foot high (a standard size), the natural draught regenerative system will give an even and soaking heat; but, if gas and air blast be used at such low temperatures, the heat in the furnace chamber is invariably found to be "patchy," because the local heating or blow pipe effect of the several gas and air blast burners will not distribute heat at this low temperature in such an even manner as the natural draught system. To further illustrate the efficiency of this furnace, temperatures up to about 1300° C. (or 2372° Fahr.) have been obtained, which is a fine achievement for natural draught furnaces.

Another furnace which resembles this one in design is the natural draught reverberatory oven furnace; but in one point it differs essentially—viz., its combustion chamber is the working chamber also. Like its precursor, it is on the natural draught principle, and requires no mechanical plant for air compression. It is heated on the reverberatory principle—*i.e.*, the gas enters the furnace chamber and preheated air travels along the furnace bottom through fire-clay tubes or channels, the hot air entering at the flame from the burner mouth, and the point where combustion takes place. The flame then passes along the underside of the furnace roof before entering the flues underneath the furnace floor, which is of exceptional strength to suit the heavier class of work. This furnace is quite satisfactory for working temperatures up to 1000° C.—viz., for carburizing, re-heating, &c.—and is a most suitable type for use where there are no convenient means of employing power-driven fans.

LOW PRESSURE GAS AND AIR FURNACES.

A new method of heating furnaces has recently been introduced, known as the "L.P.G.A." system; and the principles involved have been successfully applied to oven furnaces; also for forging work and for metal melting. For the last-mentioned work, the furnace can be constructed in either the crucible or the oven type. In the "L.P.G.A." furnaces, means have been adopted to heat the whole of the air supply necessary for supporting combustion, which takes place in the furnace chamber in such a way as to render it unnecessary to use the usual bunsen burners with their secondary air supply. Combustion of the mixture of gas and air is so near to perfection that no excess of air is required, and therefore no heat is dissipated by the carrying-off of this excess air at a high temperature, as is the case with furnaces not so well regulated as regards the admission of air. The combination of the entire pre-heating of air with the complete theoretical proportions of gas and superheated air, results in very economical working; the only heat losses being those necessarily incurred by slight radiation from the outside of the



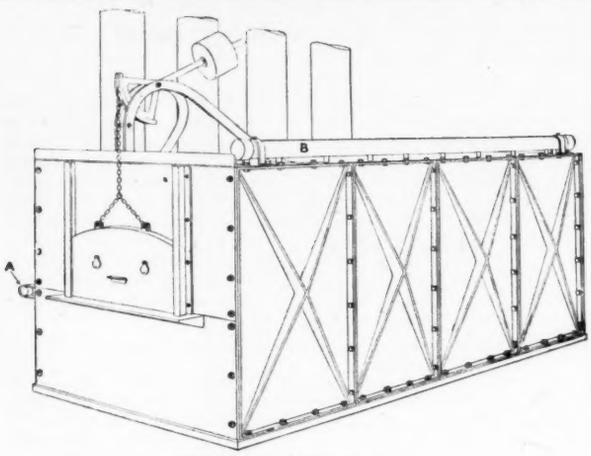
Richmond Natural Draught Lead or Salt Bath Furnace.

Richmond Gas and Air Blast Rotary "Turret" Shell-Heating Machine.

* See "JOURNAL" for March 23 (p. 743).

furnace and from the flues, in which the temperature of the gas is only that required to carry off the products of combustion.

The working of this furnace [which was illustrated in the issue of the "JOURNAL" already referred to] may be briefly described as follows: Gas at normal town's pressure enters the furnace chamber through a series of tubes from the gas-main. Air at approximately 2 inches water-gauge (the same pressure as the gas or thereabouts) enters the fire brick lining of the furnace through a series of tubes from the air main, and travels down the side and along the bottom of the furnace through fire-clay tubes. The air, thus efficiently preheated, meets the incoming gas, as above described, at which point combustion takes place.



Detail of the Muffle Furnace.

The products of combustion then pass along the underside of the furnace before entering the flue or flues; the air for supporting combustion above described being preheated by the waste products. The local heating effect of a bunsen flame and the usual combustion chamber are thus obviated.

A reducing atmosphere may be maintained under the most economical conditions by simply diminishing the pressure at the air main. Air is usually supplied by a fan; so that expensive blowers, with their cost for power to drive them, can be dispensed with. By the use of valves or cocks upon the main gas and air supply pipes, the furnace may be regulated for temperatures to a very fine degree. It is usual to fix pressure-gauges upon the outlet side of the cocks or valves, so that having first arrived at the correct respective pressures of gas and air to give the results desired in the furnace, the subsequent regulation is simple; it being only necessary to close or open the valves to give a proportionate pressure of gas and air.

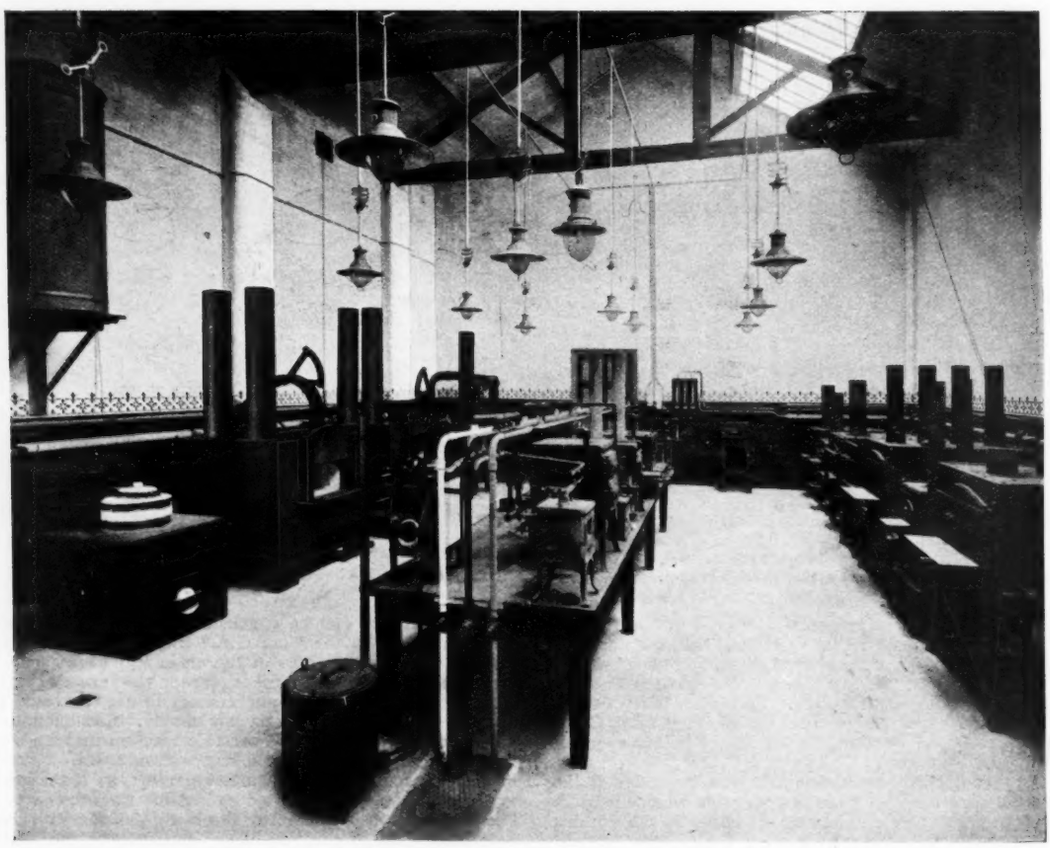
The flues are efficiently controlled by double dampers upon each; and it is a point which cannot be too much emphasized that, to obtain the best results in this or any other furnace, the flue regulation must be looked to when altering the rate of combustion. When the above-mentioned details have been attended to, a perfectly even temperature throughout can be depended upon, and the conditions of heating can be neutral, reducing, or oxidizing at will. The floor of the furnace can be constructed to take any weight of material per square foot, and, if desired, may be of brick in lieu of floor tiles.

For forging furnaces, crucible, and lead and salt bath hardening furnaces, the principles of construction are the same, with some slight modification. The highest temperatures are readily obtainable—nickel and even steel having been melted in pots. From the point of view of economy in gas consumption, steel has recently been annealed in a "L.P.G.A." furnace capable of taking eight or nine tons, with a consumption of 3000 cubic feet per ton, when six tons were being treated per charge. It is anticipated that even better results will be obtained with the furnace working at full load—viz., nine tons. Re-heating work for rolling mills has been done at the rate of less than 3500 cubic feet per ton; the material being heated to over 1100° C. In a furnace with walls of suitable thickness for such high-temperature work, this consumption should be considerably reduced.

A point worthy of note is the complete absence of noise usually prevalent with gas and air blast furnaces, which is a matter, at times, worth consideration when a number of furnaces are working together in one shop. The absence of cutting heats which destroy brickwork and tiles is another advantage, and means that the furnace lining will last much longer.

GAS AND AIR BLAST FURNACES.

When only a small working chamber is required, and of insufficient dimensions to give heat from the brick linings to preheat air used for supporting combustion, we must revert to air blast. The use of these furnaces may be limited to the tool-room for preheating and hardening of high-speed milling and planing tools, &c. A small twin chambered furnace for hardening the noses of all planing or other lathe tools will reach a white heat, starting from cold, in about 20 to 25 minutes, with a gas consumption of about 100 cubic feet an hour. A gas and air blast-oven furnace suitable for hardening high speed and carbon steel milling cutters and other tools has no door; the mouth of the furnace acting as a flue outlet, and when in operation a current of air is blown upwards



FURNACE DEMONSTRATION AND TEST ROOM OF THE CITY OF LEEDS CORPORATION GAS DEPARTMENT.

across the furnace mouth, thus enabling the operator to stand close to the furnace without inconvenience.

Application and Some Illustrations of the Present Usefulness of Gas-Furnaces.

In applying gas-furnces to their different uses, let us first consider some good reasons for their superiority over solid fuel furnaces. The most important feature is that temperatures are uniform and controllable to a degree which is an impossibility with a direct-fired solid-fuel furnace. They economize space, save labour, and are clean, and therefore may be placed in quite close proximity to machinery.

In Sheffield there are installed a very large number of specially designed coal-gas heated annealing furnaces of the natural draught, regenerator, and the low-pressure gas and air types before described; and more especially in the latter type annealing has reached a state nearing perfection. The gas-furnaces will anneal carbon and high-speed steel in bar, in charges of two tons and upwards, in 48 hours from start to finish, and without the use of a protecting box—the steel bars being placed on the fire-brick floor of the gas-oven, or, if preferred, in tubes.

The interior dimensions of these furnaces are 15 ft. 9 in. long, 2 feet wide, and 1 foot high. Their capacity is two tons of bar steel. The method of annealing in these furnaces is briefly as follows: (1) The bar steel is charged into the cold furnace; (2) the heating-up is accomplished in six hours or thereabouts, with frequent pyrometer readings; (3) all the dampers and secondary air nostrils are carefully closed, and the furnace and contents cooled down very slowly.

The following are figures from actual commercial working results in annealing steel in Sheffield.

—	L.P.G.A. Oven Furnace.	Natural Draught Regenerator Oven Furnace.
Weight of charge	6 tons	1¾ tons
Total time of heating	3 hours	6 hours
,, ,, cooling	45 ,,	42 ,,
,, ,, operation	48 ,,	48 ,,
Maximum temperature attained	850° C.	850° C.
Gas consumption per ton of steel annealed	3000 cub. ft.	3600 cub. ft.
Cost of gas per ton of steel annealed	3s. 0d.	3s. 7·2d.

It will be seen from the above table that the "L.P.G.A." oven furnace worked with an economy in gas consumption of something like 20 per cent. less than the natural draught regenerator oven furnace. Steel annealed in this furnace is free from scale, and the annealing is, if anything, more uniform. This, in addition to the time and space saved, and the omission of the packing-boxes, proves that the superiority and economy of the furnace in using town gas for this purpose are established facts.

Annealing and heat-treating armour-piercing shells are being done with gas-furnaces. One of these measures inside 8 ft. 2 in. deep by 6 ft. 3 in. wide by 7 feet high, and is capable of annealing or heat treating ten 15-inch armour-piercing shells at a time. The furnace is fitted with a lifting roof or arch, and the "L.P.G.A." system is utilized here to advantage. This is one of the largest town gas-furnaces in use. There are more than 10 tons of castings in the construction of the outer casing.

Natural draught regenerator oven furnaces are being used very largely in the Midlands for annealing brass cartridge-cases for shrapnel, for all kinds of brass and copper work—*e.g.*, copper bands for shrinking-on to shells, and for annealing wire for aeroplane structure.

I should like to have shown some good illustrations of recent furnace installations for small arms purposes; but owing to the difficulty and delay in obtaining permits for photography, I have had to abandon the idea. However, a striking example may be given of diverting the production of an exceptionally large factory engaged in the manufacture of gramophones to that of producing war munitions of various kinds, including shell cases, cartridge clips, &c. The gas tempering ovens were ordered and installed in about two weeks; and the hardening and tempering plant has since been increased for dealing with something like 150,000 clips per day.

Lead baths are being used very considerably for tempering. The following is an illustration of a bath 6 feet long used in the Government and Ordnance factories for tempering wires, springs, and various parts. This furnace is heated on the natural draught regenerative principle. The flames are drawn from top to bottom of the furnace to obviate the deteriorating action a flame has when constantly impinging on the bottom of the pot or pan containing lead or metallic salts for tempering purposes.

Furnaces of various design for heating the ends of shells for the bottling or nosing operation have been designed and supplied for the present and increasing necessity for shells. The following is an illustration of a rotary shell-heating machine. It is strongly made, and the top part, which looks like a turret, revolves on ball bearings, while the speed is under complete control. The turret revolves very slowly. The heating capacity of this machine is 120 shells per hour. The heating chamber being restricted, gas and air blast is used. A single and powerful burner plays on the bottom of the furnace from the top, and the hot gases find their exit from flues on top of the chamber. With this heating arrangement, and when each hole contains a shell, the end of the shell only is heated, and with accuracy, which is a very essential condition.

Some further particulars and lantern illustrations, giving other gas-furnace applications for the production of war material, will doubtless be of interest to you at the present time, when the productive capacity of many engineering shops is being almost entirely devoted to this national purpose. One illustration shows the well-equipped furnace demonstration and test room which has just been completed by the City of Leeds Corporation Gas Department, and to which you are the first official visitors. May I express the hope that you will avail yourselves of the opportunity to inspect the modern gas-furnaces which have been installed, among which will be found several of the types introduced in this lecture.

At the conclusion of the lecture, though the hour was late, many members availed themselves of the opportunity afforded them of inspecting the demonstration room, and were greatly interested in what they saw. A number of furnaces suitable for annealing, case-hardening, metal-melting, bolt-making, forging, rivet-heating, high-speed steel-hardening, and glory holes for the glass bottle industry were seen under working conditions. It was intimated that the room was at the disposal of the engineers of the city to make tests with their own material.

A hearty vote of thanks was accorded to Mr. Taudevin.

"T. N. T." from South Yorkshire Coal.—Lecturing in York last Wednesday week, on "High Explosives and the Need of the Hour," Professor Vivian B. Lewes, F.I.C., F.C.S., referred to the importance of the South Yorkshire coalfields as a source of trinitrotoluene, which has become so valuable as a high explosive. He stated that when the war was started he did not suppose we had more than 20 tons—certainly not 50 tons—of trinitrotoluene in the market. We had been gradually working-up the quantity, and our supply was getting more and more satisfactory. It was very interesting to know that Yorkshire coal, especially South Yorkshire, yielded more toluene than any other, and it was from the distillation of South Yorkshire coal that we should probably get the largest supplies, which would be flowing in in a very short time. The quantities were now increasing, and the arrangements for nitrating went on perfectly satisfactorily; so that one hoped the trouble of shortage of explosives would be less and less. There was one thing we could lay to our hearts, and it was this: So far our explosives were showing considerable superiority in the field; and if we could only stick to it there was not the least doubt of the end of the war. But we had to drive our very hardest to get the satisfactory ending we all desired.

Experience with Long Cast-Iron Water-Pipes.—At the last meeting of the American Water-Works Association, some 16-feet lengths of cast-iron pipe were shown by the American Cast-Iron Pipes Company. At that time the pipe had been tried in only a few places; but it has since been largely adopted, and inquiries have, it is stated, brought out almost universal expressions of satisfaction with it. The advantage of the 16-feet over the 12-feet lengths of pipe, as stated by a number of water-works superintendents and contractors, are: 25 per cent. fewer lengths to unload from cars, load to and unload from waggons and lower into the trench, fewer bell-holes to dig and joints to caulk, and less lead and jute to supply. To these savings may be added 25 per cent. less leakage hazard. On a job consisting of 18,000 feet of 4-inch and 3000 feet of 6-inch pipe, it is stated that the dry hard digging made the labour-saving due to 25 per cent. fewer bell-holes very welcome. A construction company of Kansas City (Mo.) say they have used only 16-feet lengths of pipe since these were available, and that the saving in laying is about 2 c. per foot. At Newton (Iowa) 41 12-feet lengths (492 feet) of 4-inch cast-iron pipe were laid for $65·87, or 13·4 c. per foot, and the same number of 16-feet lengths (656 feet) for $76·01, or 11·6 c. per foot, including all labour and jointing material, but not pipes.

American Commercial Gas Association Transactions.—We have received the volume of proceedings of the American Commercial Gas Association at their tenth annual meeting, held from Nov. 30 to Dec. 5, 1914, in the Armoury, Minneapolis, under the presidency of Mr. Percy S. Young, of the Public Service Gas Company, Newark (N.J.). The contents comprise a large number of reports by the different Committees, and the matter is fully illustrated. The educational activities of the Association are shown in the report of the Board of Educational Control, of which Mr. Robert Ffrench Pierce is Chairman. The scheme was inaugurated in 1912, when 725 students were enrolled in the course of "Salesmanship," and 110 of them completed it. In 1913 there were 700 enrolled, and 119 completed the course; 200 students were also enrolled for a repetition of the 1912 course, and it was completed by 67. In 1914 there were enrolled 3850 students for the first half of the course, and 1081 completed it; but answers were being received at the time of the publication of the volume. In connection with the meeting there was an exhibition of gas appliances from Dec. 1 to Dec. 5. Portraits are given of the Past-President and his successor (Mr. Harvey B. M'Lean, of New York), as well as of the Secretary and Assistant-Treasurer (Mr. Louis Stotz, of New York). The volume contains lists of the gas company and individual members of the Association.

SOUTHERN GAS MANAGERS ASSOCIATION AT CAMBRIDGE.

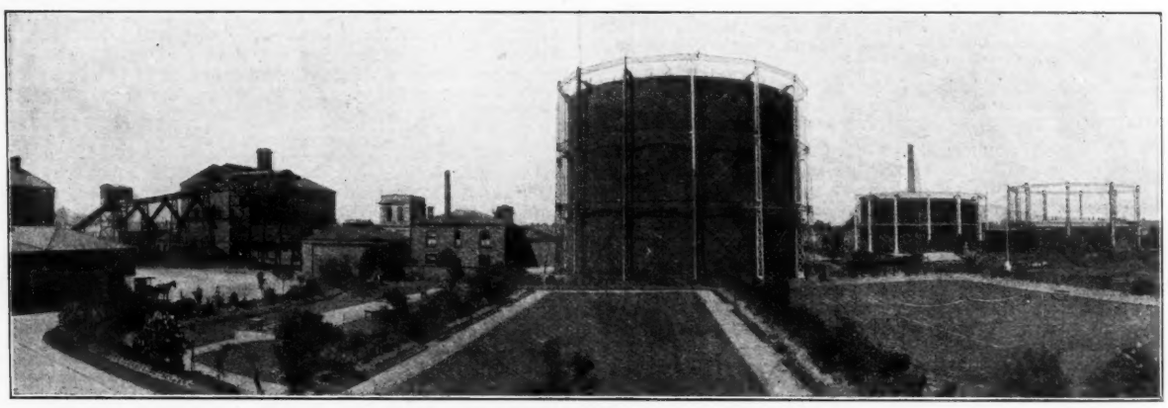
Some thirty members of the Southern District Association of Gas Engineers and Managers left St. Pancras station last Thursday morning on a visit to their President, Mr. J. W. Auchterlonie, the Engineer and Manager of the Cambridge University and Town Gas Company. A further twenty or so members reached the famous University town by other routes. If the makers of specifications had drawn up one for the atmospheric conditions of the day, they could not have been more successful in realizing something that was ideal. The sun shone gloriously; the heat from its rays being tempered by cooling breezes. The earth, too, was clothed in all the magnificence of spring freshness. Had it not been for the war, there would certainly have been a larger number of members to greet the President who was early on the platform at the station awaiting his visitors. From the time of arrival to the time of departure, the visitors were the guests of the Chairman (Mr. E. J. Parker, M.A., D.L., J.P.) and his colleagues. Mr. Parker unfortunately could not join the members. He was away in London on important financial business. Mr. Horace Darwin, M.A., F.R.S., was also absent—regretfully the members heard owing to the loss at the front of his son Mr. Erasmus Darwin. But in their absence the visitors were glad to find their hosts represented by Mr. Alderman W. B. Redfern, D.L., J.P. (the Vice-Chairman), Mr. J. B. Peace, M.A., and Colonel C. T. Heycock, M.A., F.R.S.

At the Gas-Works—New Coke-Handling Plant.

The members were first transported from the railway station to the gas-works by motor bus, where, in one of the rooms for the men (recreation, billiard, news rooms, &c.), they enjoyed light refreshments. A visit was paid to the offices, including the general office, board-room, drawing office, and laboratory; and then the workshops equipped with machine tools, electrically driven, were inspected. Afterwards the members wandered at will through the well-kept and orderly works. The works were described in our issues for Sept. 27, 1910, and June 18, 1912; but since then there have been a few changes. In accompanying the members round the works, the President was assisted in imparting information by Mr. R. Dennington, Mr. L. Barber, Mr. R. Barton, and Mr. M. Sword (Outdoor Superintendent). The Secretary (Mr. A. E. King) was unavoidably absent, as was also the Accountant (Mr. Rayner). It is unnecessary to again describe the horizontal and inclined retort-houses; but in connection with the former a very fine new coke-handling plant by Messrs. W. J. Jenkins and Co., Limited, is worth special notice. This at present only deals with the coke from the horizontal house, as the destiny of the inclined retort-house has not yet been finally determined. It may be that another system of carbonization will before long find favour in the eyes of the Engineer, and then—well, the new coke plant will have more work to do. Supplying a foreground to the new coke plant is a large open space, which can be used for storage. This has been obtained by the dismantling of No. 1 holder, which had a capacity of about 240,000 cubic feet; and the holder tank has been converted into a tar and liquor store of ½ million cubic feet capacity—the tank being covered by a reinforced concrete roof. The coke plant, as said, only deals at present with the product of the horizontal retort-house, which contains ten beds of eight retorts. Working is in eight-hour charges, and 10 cwt. to a charge; so that the coal carbonized is about 120 tons per day.

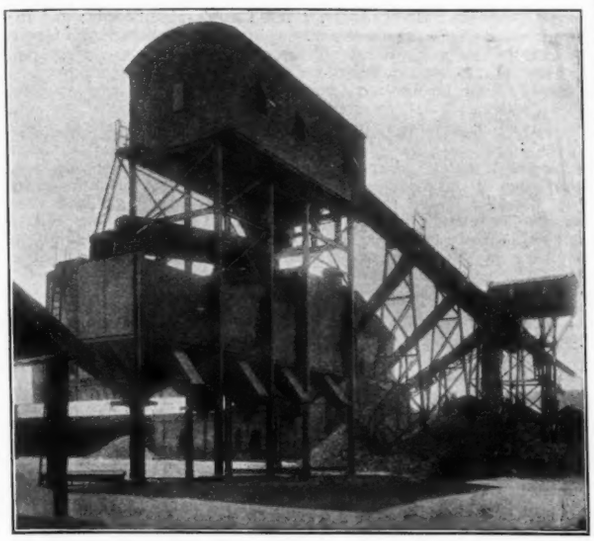
The coke-handling plant consists of retort-house, incline, and yard conveyors, breaking and screening plant, with storage hoppers, &c. The conveyor in the retort-house is of the "De Brouwer" type, running the full length of the house in front of the bench. The coke leaves the retort mouthpieces by way of deflecting-plates into the trough of the conveyor, and is carried along the house to the quenching system at the end. After quenching has been completed, the coke travels up the outside incline conveyor, which is totally enclosed, and rises, at an angle of 30° with the horizontal, to the yard conveyor. At the top of the incline conveyor is fixed a chimney of sufficient height to carry away the steam generated in the quenching arrangement. The coke is now supposed to be quenched, and travels down a shoot to the yard conveyor. This latter is placed at right angles to the incline conveyor, and passes along the yard to the screening plant, hoppers, and coke-breaker, which occupy a position at the far end of the yard. It is so arranged that should coke be required to be deposited in the yard, the hoppers being full, or for other reasons, this can be done by opening one or more of the seven outlets in the bottom of the yard conveyor; and the coke is then carried down one side of the two-way shoots devised for the purpose, to the yard or cart beneath. Six of the openings are fitted with slide-doors, which are operated by a wheel and screw from the platform fixed alongside the conveyor. The last opening, however, in the conveyor-trough has a two-way shoot fixed, with a flap-door operated by a lever, which can deliver coke either to the rocking-bar screen or to the coke-breaker, as required. This screen takes out all the coke below 1½-inch cubes; the large lumps passing along down the screen to the hopper for the large coke, situated below.

Any coke smaller than 1½-inch cubes is taken down a steel-plate shoot to a second screen, as is also the coke from the breaker, when the latter is in use. This second screen is of the rotary type, and separates the coke into three sizes—small coke, breeze, and dust, which fall into the hoppers provided beneath. There are four of these hoppers. The first is for large coke, and holds 24 tons; the next three are for dust, breeze, and small, and hold 17 tons each. At the base of the cones are outlets with slide-doors and bagging fittings for loading the coke into bags as required. A platform is in course of construction to facilitate this being carried out easily. In addition to the bagging arrangement above noted, there are also provided side shoots, from each of the hopper cones, with doors at the end, so that a cart can be backed under and filled with large or small coke, breeze, or dust, in a very short time. All the plant is driven by electric motors—one driving the retort-house and incline conveyor, one the yard conveyor and screening plant, and one the coke-breaker. These motors, together with the driving gear, are placed in two small corrugated iron buildings—one at the head of the incline conveyor, containing the motor and driving gear for the retort-house and the incline conveyor, the other over the storage hoppers containing the motor and driving gear for the yard conveyor, the screening plant, &c. But the plant can be set in motion, either the whole or any part of it, from the retort-house, in which there are starting switches fixed to the wall. As previously mentioned, the plant was supplied and erected by Messrs. Jenkins and Co.



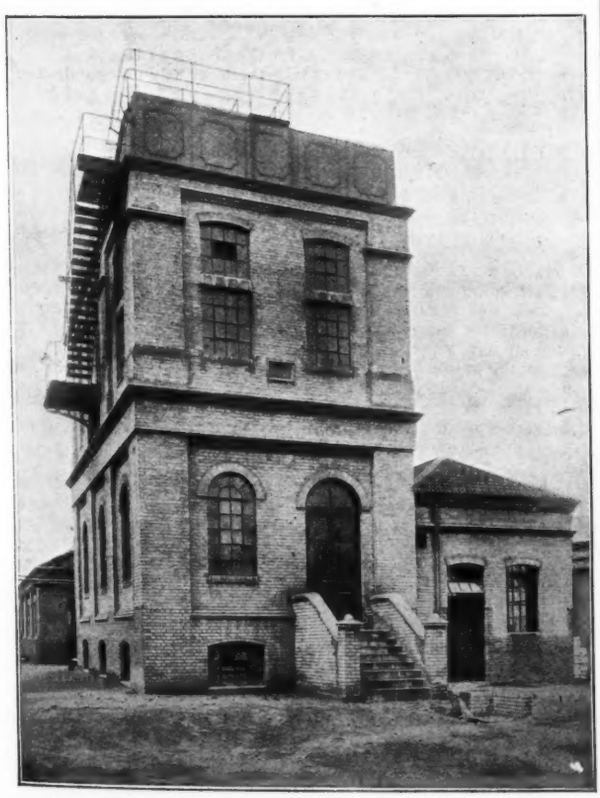
A VIEW OF THE GAS-WORKS AT CAMBRIDGE.

One other of the more modern changes is the new boiler-house and electricity generating station. The boiler-house is 54 ft. 5 in. by 42 ft. 4 in., and contains two Lancashire boilers, 7 ft. 6 in. diameter by 30 ft. long, while provision has been made for a third boiler. The boilers are fitted with Goodrich and Hamlyns patent furnaces and fed with coke breeze, the normal steam pressure supplied to the works being 90 lbs. per square inch. The generating station building—a steel structure with brick filling—is 40 ft. by 23 ft. by 40 ft. high. In the basement, the boiler feed-pumps and exhaust steam feed-water heater are situated. The exhaust steam from the various engines passes through the heater; and, by this means, the temperature of the feed water is raised to about 205° Fahr. The pumps are in duplicate, and capable of delivering 600 gallons per hour against a pressure of 150 lbs. per square inch. The ground floor is set apart for the engines, dynamos, and main switchboard. There are two high-speed steam-engines (coupled direct to the electric generators) by Messrs. W. H. Allen and Sons. The engines are of the enclosed type, and work with forced lubrication at a pressure of about 15 lbs. per square inch. The compound wound dynamos, with interpoles, develop 50 K.W. and 75 K.W. respectively at 220 volts. The main switchboard is



The Coke Conveyor and Screening Plant.

by Messrs. Dorman and Smith. It is of enamelled slate, and comprises generator panels, shunt regulator panels, and circuit panels. Each dynamo is provided with an automatic reverse-current circuit-breaker, triple-pole switch for paralleling purposes, and double-pole fuses. Every circuit has an automatic overload circuit-breaker, and is also fitted with ammeter, single-pole switch, and single-pole fuse. The volt meter above the switchboard is common to both dynamos; and there is also a wattmeter for registering the watts absorbed by the various motors throughout the works—including, of course, the transmission losses. A 2-ton travelling crane is erected overhead for lifting any part of the engines or dynamos whenever required. On the first floor there is a softened water storage tank, with a capacity of 6000 gallons; and a water-softening plant capable of treating 600 gallons an hour. This is by Messrs. Lassen and Hjort, of London. The main water-storage tank forms the roof of the structure, and holds 25,000 gallons. A three-throw pump (6-inch bore) erected in the adjoining pump-house delivers water into the overhead tank from an artesian well sunk on the works, the depth of which is about 100 feet. In the same pump-room are situated the necessary tar and liquor pumps. The works have also been supplied with new gas-washing plant. There is a Pelouze and Audouin tar-extractor by Messrs. Holmes, of Huddersfield; a centrifugal washer by Messrs. Kirkham, Hulett, and Chandler, of a capacity of 2 million cubic feet per day, and electrically driven through mitre-gearing; as well as a rotary brush scrubber (steam-driven), by Messrs. Holmes and Co. One of the gas-holders (No. 4) has been fitted with an additional lift—a flying one. This has increased the capacity of the holder to 800,000 cubic feet. The members were also much interested in Hewett's fool-proof gasholder valve. At the present time a new steam range (overhead system) is being fitted for the whole of the works, to supersede the existing underground steam supply.



The Power House.

Luncheon.

Having exhausted the features of the works, the members were next transferred to the Lion Hotel, where they were the guests of the Directors of the Company. Alderman Redfern, the Vice-Chairman, presided, in the already explained absence of the Chairman. The other Directors present were Mr. J. B. Peace, M.A., and Colonel C. T. Heycock, M.A., F.R.S. The guests included his Worship the Mayor (Mr. Cornwallis Raynes), Alderman Stace, the Chairman of the Newmarket Gas Company (Mr. Robert Stephenson), the Chairman of the King's Lynn Gas Company (Dr. Brown), and the Chairman of the Halstead Gas Company (Mr. J. T. Jolliffe). The luncheon was as excellent and generous as the welcome by the Directors of the Company.

After luncheon, the loyal toasts were honoured.

Mr. W. E. Price then submitted the toast of "The Corporation and Town of Cambridge." In happy phrases, he complimented the Mayor and Corporation upon the beauty of the surroundings of the town, and upon the evidences of the thoroughness of the Corporation management of the municipal affairs. At the same time, the sympathy of the visitors went out to the Corporation and residents in the matter of the effect that the unfortunate war had had upon the town. Cambridge had felt the war in very great measure owing to the wonderful manifestation, through the response to the call to arms, of the loyalty of the undergraduates. The colleges that day could only claim about one-third of the number of students of normal times.

The Mayor thanked the members very cordially, for the enthusiastic manner in which the toast had been honoured, and for the sympathetic references to the effects of the war. Referring to Mr. Price's remarks as to the administration of the affairs of the town, he said the Corporation were not occupied with an enormous amount of municipal trading. They had excellent supplies of water and gas. He did not think there was a single Board in the country who had such high qualifications for the direction of a gas enterprise as the Board of their Gas Company; and the Corporation did not believe in interfering with experts. Among the Directors, they had two Fellows of the Royal Society—one a chemist, the other a physicist. They had also an eminent engineer. The Chairman was a financier; and the Vice-Chairman a business man. He for one would be very sorry to disturb such an administration. In connection with their contract with the Corporation, a question of abatement arose recently. The Corporation knew what they were entitled to; and they put forward a figure as friend to friend. He was delighted to say that their expectations were more than fulfilled, because the Board recognized that they were not only out for trading, but were also representatives of the ratepayers. The Board gave the Corporation more than the latter asked. He hoped the visitors that day would carry back pleasant recollections of their visit, notwithstanding that Cambridge was not itself at the present time.

Mr. Peace, in giving the "Southern District Association of Gas Engineers and Managers," heartily welcomed the visitors in the name of the Chairman and Directors of the Compony. He was sorry they were not there with the usual life of the town about them; but they had a beautiful day. The Company had had Gas Associations with them on previous occasions; and he had observed one characteristic about them all, and that was they seemed to be very happy families. A notable characteristic of the gas profession also was that it was their practice to expose their secrets one to another. The visitors had seen the gas-works that morning; and he could safely leave the plant to their judgment. He thanked the Mayor for the way in which he had referred to the Board; and he desired to say that the Board had a sterling good man in Mr. Auchterlonie. They were backed up heartily by him; for he had thoroughly at heart the Company's interests, as well as those of the town. He coupled with the toast the name of their Engineer—the President of the Association.

The President said his first duty was to thank Mr. Peace for the very kind words he had used in proposing this toast. His second duty was to tender cordial and sincere thanks to the Chairman and Directors of the Gas Company for their kind hospitality to the members that day. He ought to explain to those gentlemen who had met members of the Eastern Counties Association, that some of them were also members of the Southern Association; but there were other members of the Southern Association who had not been in Cambridge before. Their Association had something like 200 members drawn from the Thames to the Bristol Channel and beyond. They were on this account that day rather off their ground; but this was due to the fact that he was for some time in London, and was a member of the Southern Association, who had honoured him by electing him President. He should like to express his own thanks to his Chairman and Directors. The hospitality they had shown that day to the members he took as a personal compliment and honour to himself; and it was only one of many kindnesses his Directors had shown him during the years he had spent in Cambridge. He did not think this was due to any merit of his own, but to the natural courtesy of his Directors, without exception.

Mr. Thomas Glover proposed the "Health of the Chairman and Directors of the Cambridge Gas Company." He remarked that the Directors had entertained the Institution of Gas Engineers and the Eastern Counties Gas Managers' Association; and whenever gas men visited Cambridge, they were well received. The visitors were all delighted with the helpful relationship they found existing between the Directors and the Engineer. They were glad the Engineer had a Board

who appreciated him; they were glad the Board had an Engineer who appreciated them. Where this relationship existed, they never failed to find a successful gas company. The Cambridge Gas Company had a Board that would frighten some engineers. It was not a Board of ordinary type. They had an expert in chemistry and one in mathematics; and in the Chairman they had an expert banker and diplomatist. This was a strong combination; but the Engineer was not embarrassed because these experts were all gentlemen. One did not like to draw comparisons; but he supposed it was not always the case that experts were gentlemen. However, the visitors were delighted to be in this city of ancient learning. He had no doubt the Chairman and Directors had their share of trouble, and their Engineer had his share of anxiety, of which he transmitted a little to the Board. But they were living in troublous times. They had to face a heavy increase in the price of coal; and they had trouble regarding tar. Cambridge had been depleted of many of its inhabitants; but the Company were in a strong financial position, which they had built up in times of peace, and which would now enable them to weather the storm.

Alderman Redfern, having thanked Mr. Glover and the members, gave some particulars as to the present condition of the Gas Company. He first alluded to the enormous number of men who had been drawn by the war from both University and town. In the University there were now only about one-third the ordinary number of men. Out of a staff of about 220, about sixty of the Gas Company's men had joined the Colours. The Board had given every facility to the men to do this, with the promise that, if they came back (which please God they might do), they would be replaced in their old positions. In common with other gas undertakings throughout the country, they had had tremendous trouble with the supply of coal. The Board hoped that the general export of coal would now be discontinued, and that the supplies would be retained here for home purposes. The prices of other materials had also gone up considerably; and what with increased wages and war allowances the Company's expenditure had gone up very much. The cost of coals had gone up enormously. This year they would be paying something like 5s. 6d. or 6s. 3d. per ton more, which would mean to the Company something like £12,000 a year. This was a startling increase. The Board were proposing to put up the price of gas. As 1d. per 1000 cubic feet represented £1755, the Board had decided to increase the price by 5d. He did not think that consumers knew the difficulties under which gas companies were now labouring. But the public forgot that in 1902 the price was 3s. 2d. per 1000 cubic feet; and it had been brought down to 2s. 7d. The Board considered the price that was being charged for coal was most unfair and exorbitant; and they hoped that there would be legislation under which consumers would be dealt with more favourably. He should like, on behalf of the Directors, to add a word of praise of Mr. Auchterlonie. A better manager could not be found anywhere. In conclusion, he repeated a very hearty welcome to the visitors.

Through the Colleges.

The members then visited many of the principal colleges, and, through Mr. Auchterlonie's influence, were able to inspect many of the beautiful historical features, as well as wander through the charming grounds, where perfect peace appeared to reign.

The Military Hospital.

From the colleges a visit was paid to the 1st Eastern R.A.M.C. Hospital—huge temporary buildings which have been specially erected for the accommodation of wounded men from the front. Here the visitors were received by Colonel Griffiths, the Medical Officer in charge. In the wards there are 1250 beds, and the medical staff is composed entirely of Cambridge doctors. The structures are splendidly designed for the purpose; and the organization is complete. Painful were the sights that met the eyes in one of the wards—strong men laid low, some only temporarily incapacitated, some crippled, some human wrecks, the majority withal cheerful. Just as the visitors were leaving the place, the military band that had been performing during the afternoon struck up the "National Anthem." With the hand of war heavily upon them, the occupants of the beds in the wards gave vocal demonstration to their loyalty.

There was a peep through the doorway of the extensive kitchen in which gas apparatus of Messrs. Arden Hill and Co.'s make has been installed. Eight large roasting-ovens, a boiling and frying table, nine 20-gallon boilers, two stock-pot stands, two hot closets, carving-tables, and other accessories are there to provide for the inner wants of the representatives located there of Great Britain's heroes.

Newnham College.

A short walk brought the visitors to the beautiful grounds and buildings of Newnham College, through parts of which they were allowed to pass by special permission willingly granted to Mr. Auchterlonie by Miss Katherine Stephen, the Principal. Refinement reigned throughout the whole place; and the visitors were delighted and grateful for the privilege courteously accorded to them.

Tea and Adieu.

From here the visitors walked to the Lion Hotel, where tea was served. Before the visitors separated,

Mr. H. C. Head (Hon. Secretary of the Association) remarked that they were getting near the end of the visit; and he felt sure it would be the wish of the members not to leave Cambridge and finish their wonderful day without tendering to the President their sincere appreciation for all he had done to add to their pleasure and interest. The preparations that had been made for their reception and entertainment had been complete; and the day had been most enjoyable and instructive. Their appreciation of the kindness of the President was very sincere. [Cheers.]

The President thanked Mr. Head for his kind words; and the members for their endorsement. That the members had enjoyed themselves was to him the greatest recompense. He was very pleased to have had the opportunity of welcoming them to the town; and he was only sorry he had not been able to devote more time to them individually. He had received quite a number of letters of regret at inability to be present. One was from Sir Corbet Woodall, in which he said:

It is with unfeigned regret I am obliged to excuse myself from attendance at the meeting of the Southern District Association under your presidency, and from the luncheon, to which you and your Directors have kindly invited the members. The situation, especially in the matter of coal supply, is so difficult just now, that I feel unable to take a day off, even for the great pleasure the visit to Cambridge would afford.

Mr. James W. Helps also wrote:

I am so sorry I cannot be with you to-morrow. I feel sure you will have a delightful time. I have not been feeling well lately, and have come to stay here [Westenhanger] with my sister for a change; and the distance to Cambridge is too far to allow of my joining you. I do hope you will have a most successful day. Please convey my kind wishes to my old friends of the Southern District Association, and say how sorry I am not to meet them. I shall think of you and them, and of the many happy days I have spent in their company in the old times. Please also thank your Directors for their kind invitation to lunch, which I am so sorry not to be able to accept.

Soon afterwards the London members had to leave to join the six o'clock train for London. They did so filled with the pleasures of this "day off" from the more than ordinary strenuous duties of their official lives.

NITROGEN TRADE MONOPOLY IN GERMANY.

Possible Future Influence on the International Sulphate Market.

[From a Dutch Correspondent.]

There is a French aphorism which says: "Un homme préparé en vaut deux." It seems to me that it is worth consideration at the present time, in view of what has recently taken place in Germany. I therefore venture to offer the following observations.

By a decision of the Bundesrat, there has lately been established in Germany a monopoly of all nitrogenous materials for a period of seven years—*i.e.*, till March 31, 1922. It applies to the following products: Inorganic nitrogen materials (nitrates of potash and soda); primary artificial nitrogen products (nitric and nitrous acids and ammonium cyanamide); and all nitrogenous fertilizers prepared from these products or in other ways. The report accompanying the decree constituting the monopoly sets forth that Germany has succeeded, by making very great efforts and expending large sums of money, in building-up an industry for the production of all the nitrogenous materials needed for trade and industrial purposes, a supply of which from abroad is impossible during the present war. It may be asked whether this home manufacture of all the primary nitrogen products required in Germany is only a show-off with the use of big words, or whether it is really possible for the Germans to extend their chemical industry so far as to make them entirely independent of foreign supplies. As the facts are before the writer, and he is able to gauge their value, a review of the position may produce some useful data.

For the production of nitrogenous manures from her own raw materials, Germany has, first of all, her coals. The destructive distillation of this coal produces, among other things, a certain quantity of ammonia, which appears on the national and international markets chiefly in the form of sulphate. In 1913, the total production of sulphate of ammonia amounted to 550,000 metric tons. In the same year the German consumption of this fertilizer amounted to 460,000 tons; so that there was a surplus of 90,000 tons available for export or for other purposes. But in 1913 Germany also consumed no less than 800,000 metric tons of nitrate of soda; and as of this article there was no home production, the entire quantity had to be imported from Chili. As the German Nitrogen Act sets forth that the home consumption of nitrogen fertilizers will be made independent of a supply from abroad, this means that a quantity of more than 800,000 tons of saltpetre has to be produced from other sources found in the country itself.

With some show of pride, the Germans wish to tell us that, in the first place, these sources are chiefly to be found in the air; and, secondly, that the methods for using them have, for the greater part, been discovered by Germans. In practice, the fixation of atmospheric nitrogen is chiefly effected by the following methods: (1) Production of nitro-lime or Norge-saltpetre by the Birkeland-Eyde process; (2) production of the same material by the Schoenherr process; (3) fixation of nitrogen by carbide, with formation of cyanamide by the Frank-Caro process; (4) production of ammonia by the Szerpech process; and (5) the Haber ammonia process.

The production of nitro-lime in the Birkeland-Eyde process is based on the use of a very large quantity of electrical energy. Owing to the influence of magnets, a high-tension flame arc is blown out to a disc about 7 feet in diameter. Through this flame disc a current of air is driven; and under the effect of the high temperature the nitrogen and oxygen in the air combine to form nitrous and nitric oxides. By thorough condensation and oxida-

tion, dilute nitric acid is obtained, which is neutralized by limestone, so that a solution of nitrate of lime is formed. This solution evaporated to dryness produces the grey nitro-lime, which is equal in quality and fertilizing value to Chili nitrate, but has the defect of being much more hygroscopic.

The Schoenherr process was discovered by the chemist of the Badische Anilin und Soda Fabrik. Its special feature is that the flame arc is not spread out to a disc, but is lengthened to the extent of about 24 feet under the influence of a very powerful air current. Over its entire length the air current turns round the arc, and the contact time being much longer, the production per unit of current is somewhat increased. In all other respects the system works as the Birkeland process.

The Frank-Caro process is of a totally different character. In this, as in the Szerpech and Haber processes to be noticed later, nitrogen is to be used in the pure state—*i.e.*, totally free from oxygen. Preliminary treatment of the air for the removal of the oxygen is therefore inevitable. Though there are many systems existing for the separation of nitrogen and oxygen, it is generally preferred to make use of the Linde process. The air is liquefied, and afterwards partially evaporated, so that the final products are the pure gases. In the Frank-Caro—or, as it is also called, the Frank-Caro-Linde—process, nitrogen is passed over granulated calcium carbide heated in a closed furnace to about 1200° C. The nitrogen is fixed by the carbide, with the formation of cyanogen compounds. In its practical application in agriculture, this manure has some disadvantages, owing to certain special properties; and the consequence has been that it has not always been possible to find a suitable market for the product. Therefore the majority of the works producing it do not put it upon the market, but convert it into salts of ammonia. The cyanamide is dissociated by live steam, when almost all the nitrogen is driven off as ammonia, which is recovered in the form of the very marketable sulphate. This system is therefore practically a method for the production of synthetic ammonia.

The fourth system—that of Szerpech, a Hungarian in French service—is somewhat intricate. Crude ferruginous alumina, and more particularly a type familiar in the gas industry—viz., bauxite, used for the production of gas-purifying material—is heated with coal in a current of nitrogen. The action causes the formation of aluminum nitride—a molecular combination of aluminum with nitrogen. When this nitride is heated under pressure with caustic soda-lye, sodium aluminate is formed and gaseous ammonia set free. Up to now this process has been chiefly carried out in France by the Société des Cyanures.

Last, but not least, there is the Haber process, in which nitrogen and hydrogen are mixed in the proportions of one volume of the former and three volumes of the latter, and the mixture conveyed under a pressure of 170 atmospheres, and at a temperature of about 500° C., over iron of the utmost purity. The two very unfriendly gases combine to a certain extent, producing immediately gaseous ammonia of high purity. As the gas is already under high pressure, the ammonia is directly recovered in the form of liquid ammonia, or the gaseous mixture may be sent forward through a sulphuric acid saturator, when sulphate of ammonia is formed. The hydrogen required for working the process is prepared from blue water gas, which is mixed with steam and passed through reaction-tubes filled with iron. The steam and the carbon monoxide, under the catalyzing action of the iron, form carbon dioxide and hydrogen; and the former is washed out with carbonate of soda.

The Haber process is worked by the Badische Anilin und Soda Fabrik, which concern has at Oppau special works designed for a yearly production of 30,000 metric tons of synthetic sulphate of ammonia. They started in the autumn of 1913; and it was this new rival on the market that caused the famous sulphate war with the Coke-Oven Trust, owing to which sulphate prices fell considerably at the beginning of 1914. Nevertheless the synthetic process proved to be a success, and the necessary steps were at once taken for the extension of the production to 140,000 metric tons per annum. This installation was all ready at the beginning of the war; so that Germany was able to meet the falling-off in sulphate production caused by the shutting-down of a large number of coke-ovens. The question is whether the process is remunerative, as, in general, processes for the fixation of atmospheric nitrogen require a very large quantity of energy.

When comparing the consumption of energy by the different processes, we find the following figures in units of current per kilogramme of fixed nitrogen: Birkeland-Eyde, 62; Schoenherr, 59; Frank-Caro, 24; Szerpech, 12; Haber, 2. These figures show that the two first-named processes are only financially remunerative where large quantities of electricity are to be had at a very low figure—*i.e.*, in the neighbourhood of waterfalls. The next two processes also require low-priced current, but not to such an extent as the nitrogen-combustion systems; and they are applicable in places where cheap electricity may be generated as a bye-product—for example, where power gas is used. But the very low consumption of energy in the Haber process enables it to be worked wherever combustibles are to be had at normal prices. In this process a low cost for the hydrogen is essential; and the new production methods make it possible to lower the cost price of hydrogen to about 1s. per kilogramme, or about 2s. 6d. per 1000 cubic feet. Under these circumstances, the cost price of the gaseous ammonia becomes something like 3d. per kilogramme, leaving a nice margin for profit, when we consider that in normal times the market value is about 11d. per kilogramme.

It is the Haber process which has been principally taken up for the nitrogen monopoly in Germany; the Government of the Kaiser having provided the money for extensions of the plants of the Badische concern to unknown magnitude. But this is not all. The ammonia prepared by the synthetic method has very high purity, and is therefore very useful for the Ostwald process, which consists in the ammoniacal vapour being mixed with the calculated quantity of air necessary for the combustion of the nitrogen and hydrogen to nitric acid and water vapour. The gaseous mixture is conveyed at hurricane-speed through heated tubes filled with platinated asbestos, and the action of the platinum causes the chemical combustion. It depends upon the temperature and the velocity of the stream of gas whether only nitric acid or nitrate of ammonia is formed; but in both cases the reaction products are delivered in an accessible form.

This process was in operation for some years at the Lothringen mine in the Westphalian district; and the financial results were stated to be satisfactory. But, owing to the easiness with which nitric acid and nitrate of ammonia may be obtained in other ways, there was no reason for any extension of the plant. The war has brought about great changes in the situation; and it is now a matter of considerable interest that there has been some practical experience with this system. It is at the present time beyond doubt that a large part of the nitric acid consumed for the production of explosives in Germany is prepared from the nitrogen of the air by the combined Haber-Ostwald process; and it is stated, on very good authority, that it is the intention to make the plants of such dimensions that in normal times the total output of nitrogen products in Germany will exceed the consumption by 80,000 tons. As in the last year before the war the consumption in Germany was 800,000 tons of nitrate of soda and 460,000 tons of sulphate of ammonia, and the total production of sulphate was about 550,000 tons, whereas the whole of the nitrate had to be brought from Chili, these 800,000 tons of nitrate will have to be manufactured in home plants.

And now I come to the vital point—the financial question. It is quite clear that the German Government intend making money out of nitrogen, or, in this case, out of the air. This is probably the first instance in history of a Government going to use the atmosphere as a source of money. But owing to this scheme it may be taken as certain that in future the German market for fertilizers will be a stiff one—or, rather, there will be no market at all, as the prices are, of course, to be regulated by governmental decree. On reading between the lines of what appears in German publications, one finds that the German manufacturers look with something like sorrow into the future of sulphate of ammonia disposal, for open competition will be a hoax. As to its effect on the markets of the civilized world, we may ask ourselves, with mixed feelings, what the future has in store for all those who are interested in the production of sulphate.

In all things we ought to consider that the intentions of the Government scheme are not only the home-made supply of nitrogenous fertilizers, but also the stiffening of the Treasury. This means that the Government are not likely to begin a campaign of cutting prices by opening new areas of sale for nitrogen products. But, on the other hand, there is the menacing possibility that the huge quantities of nitrate which are not taken by Germany will have great influence on the market for this product. So far there is a factor of safety, as the Chilean producers have declared that nitrate prices cannot go farther down—the costs of production having risen to such an extent that there is left scarcely any margin of profit. Further depression in the market will therefore be answered by shrinkage in production. This is very hopeful for the sulphate market; for there is some possibility that the Germans might try to cut nitrate prices by exercising pressure upon the sulphate market. When they could succeed in depressing nitrate prices by lowering those of sulphate in the non-Teutonic countries, they would be in the position to buy nitrate at cheap rates, and sell in their own country at fairly high figures.

My opinion, therefore, is that the international sulphate market ought to be made as strong as possible, now that German competition is totally lamed. We ought to ensure our sulphate position in every possible manner, so that while the "mailed fist" is raging, everywhere in the world, the ploughshare finds our sulphate ready for duty. The way to this strong position may prove to be not even so long as that to Tipperary.

Electric Power in Gas-Works.—The Engineering Supplement to "The Times" last Friday contains an article on "Power for Gas-Works Purposes," and the merits of electricity are emphasized. The writer points out that, when consumed in connection with gas-works appliances, current is seldom, if ever, taken direct from the district supply, as the price would in most instances be prohibitive. When, however, it is generated by gas-engines, he says there is probably no cheaper form of power. This is particularly the case so far as gas-works are concerned, for the heavy costs of distribution are avoided. Thus the quantity of gas consumed by the engines must be reckoned on "cost into holder" figures. The writer adds that the majority of the larger gas-works, when efficiently controlled, have in normal times no difficulty in putting gas into the holder at a cost considerably less than 1s. per 1000 cubic feet; while in one notable instance the cost—being more than met by residuals—works out at a minus quantity. In other words, gas is put into holder at a profit.

CONTINUOUS OPERATION OF RETORT-BENCHES.

The Superintendent of the Erie (Pa.) Gas Company (Mr. G. Falkenstein), whose works passed into the hands of the Erie Lighting Company, and were shut-down early this year, recently gave his experience in connection with the continuous operation of gas-retorts, and it is recorded as follows in "The Gas Age" (New York) for the 15th ult.

The Erie Company had three benches of nine retorts, each 9 ft. 3 in. long, and holding charges of 385 lbs. These were carbonized in six-hour charges, and the hot coke (representing 21 per cent. of the coal carbonized) for bench-firing was valued at about $1700 per annum. Under the boilers slack coal was used costing $1·80 per short ton. Before employing surplus gas in the firebox, the boiler coal cost from $500 to $600 a year, which was reduced by $216 through using gas fuel. The purpose of keeping all the benches in continuous operation will be appreciated by all works foremen: (1) The regular employees were kept at work steadily; (2) even heats in the benches were possible, avoiding damage due to expansion and contraction of the retorts and brickwork; and (3) increase in the quantity of bye-products and in their quality by adopting medium heats.

The evils which come from laying-off men are well known; and continuous employment needs no demonstration. The retorts are operated at a good red heat, by which the coal is made to yield about 10,000 cubic feet per short ton. Medium heats prevent the formation of lumpy tar, and keep it so liquid that it flows easily; in fact, where the free carbon in the tar was formerly 35 per cent., by medium heats this was reduced to 23 or 24 per cent., and there was no stoppage for several years, no main to clean, no ascension pipe to burn out. Medium heats also keep down repairs, keep up the candle power, reduce naphthalene trouble, and in general simplify the conditions of operation. By working under this medium heat and at uniform temperature without letting down, the Parker-Russell fire-clay retorts were run five years without repairs, and were then in good condition.

When the holder was filled, instead of letting down a bench, gas was taken off between the washer and purifier by a 2-inch pipe running to the boiler firebox—the pipe being passed through the firing-door, which was left open. The gas was under the holder pressure of 5 inches; and the long flame burnt above the fuel bed without any brickwork or special arrangement. While the gas burnt, the fuel bed remained dormant, but livened-up again on the pipe being removed and the doors closed. Generally, coke breeze was placed on the grate-bars, while gas was burnt. Some little soot resulted from the gas-flame. When the holder was down sufficiently, gas was cut off from the boiler.

The ammonia washer was operated so that the maximum possible quantity of ammonia was removed, which meant that the liquor was but 1 per cent. strong when it went to the concentrator. However, this was operated by a steam injector which heated the liquor up to about 200° before it entered—thus increasing its capacity several times.

During the financial year 1909-10, the usual method of operation was in practice; but in the year 1910-11, low heats, continuous and uniform operation, and boiler firing with surplus gas were first tried. The results are shown in the following table:

	Boiler Fuel. Coal Slack.		Boiler Fuel. Coal and Gas.
Gas made, 1000 cubic feet	42,103	..	40,469
Coal carbonized, short tons	4,215	..	4,020
Income from residuals	$11,688·00	..	$14,372·00
Do. per ton of coal carbonized	2·77	..	3·57
Holder cost per 1000 cubic feet made	0·1668	..	0·1403
Works pay roll	7,163 00	..	7,455·00

The profit made in the latter as compared with the former year was about $2240. Adding to the gain in residuals income—viz., $2684—the 120 tons of slack coal saved by using gas (120 × $1·80 = $216), we get $2900. Deduct from this the extra cost of labour owing to continuous working, $7455 − $163 = $292, we have a gain, due to the change in operation, of $2608, which is more than the profits gained.

Waverley Association of Gas Managers.—The 99th meeting of the Association will be held in the Cathedral Hotel, Edinburgh, on Friday, the 11th inst., under the presidency of Mr. Cuthbert Hamilton, of Loanhead, who will deliver an address. At the conclusion of the business, the members will dine together; and it is proposed afterwards to visit the Scottish Zoological Gardens at Corstorphine.

Oxy-Acetylene Welding.—In a general review of the process of oxy-acetylene cutting and welding delivered before the Illinois Gas Association, it is stated that, from the standpoint of volume of work carried out by this process, America leads, with Germany second, France third, and England fourth. As one feature of the work executed in Germany, it might be mentioned that piping of all sizes and character is now being made by rolling from flat plate and welding by means of the oxy-acetylene torch. Piping is also being laid without the use of threads or flange joints. In this way pipe of about one-half the thickness of standard pipe can be used. It is stated that at Cologne, in the Palace of Justice building, recently completed, there are nearly seven miles of piping in which there is not a single threaded joint, all being welded by oxy-acetylene.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Uniformity in Gas Companies' Balance-Sheets.

SIR,—I have read the article under the above heading with a great deal of interest, but must at once say that I do not altogether agree with the writer.

To some extent the evil complained of—*i.e.*, the tendency to "hide things," if the term is allowable—seems to me to have arisen during the time (some years ago now) when so many attempts were made (especially by corporations or councils) to obtain, by means of heavy and constantly increasing assessments, a substantial share of the profits earned by gas companies.

With the advent of electricity, and the avidity with which this was taken up, more especially by municipal traders, the "sport" of attacking gas companies through their accounts has somewhat died-down—possibly because the "hiding away" made the dissection of the accounts more difficult, and therefore more costly, but also because retaliatory measures could be, and were, made by the companies on municipal trading accounts whenever an opportunity such as a Local Government Board inquiry offered.

I am still of the opinion that although the need for this form of protection may have died-down, to show too much on the accounts is bad policy. It must not be forgotten that our statutory obligations, and particularly as to how the accounts are to be prepared, were laid down for gas companies when a monopoly of lighting and heating was in their hands. Conditions have altogether changed; but the obligations remain. Why, therefore, interfere with a system of preparation of accounts that has arisen through the need for self-protection?

Apart from figures that may or may not gladden the heart of a statistician whose chief effort in life is to collate so-called comparative figures, what really useful purpose can the suggested standardization of accounts serve? As a comparison of working, it must be unreliable. On one side, the accountant has to see that the accounts suit the shareholder, and (in these days a new but just as critical a factor) the co-partner. On the other, he has the consumer, who, unless he is also a shareholder, does not care twopence about a sliding-scale, but always resents a rise in dividend.

To put my point briefly. Supposing the accounts are kept on the general lines laid down in the article, what is the accountant up against? (1) The accounts should present the best view to the proprietor, the shareholder. (2) They should show to the consumer that he is not being unduly exploited for the benefit of the shareholder. (3) They should show to the more than observant eye of the income-tax assessor that the profit made is not lessened by any manipulation of figures likely to interfere with the proper apportionment for tax. (4) They should show to the local rating authority—nowadays essentially hostile—that the company is either stationary or on the decline; otherwise re-rating is at once necessary. (5) They must show to the prospective purchaser of shares that the purchase will not only be worth while, but likely to turn out much better. (6) Some day they are likely to be analyzed more thoroughly than ever, before a Parliamentary Committee.

How can all these conflicting elements be satisfied if the accounts are to be standardized on some common grounds? It seems impossible. In my opinion, the preparation of the accounts must be affected by local conditions; and if this is admissible, then use for comparative purpose is *nil*.

I have not touched upon the great differences that appear in all gas accounts, due to the locality of the undertaking. I mean, for instance, the distance from the coalfields or from any centre where materials for the manufacture and distribution of gas can be obtained, must vary the figures immensely. The difficulties, too, that arise in the disposal of residual products affect the prices so much that comparison is hopeless. I cannot imagine the manager or secretary in (say) Cornwall or Caithness getting much satisfaction out of a comparison of his accounts with those of a London or Lanarkshire company, or what use standardization of accounts would be to him or anyone else.

May 27, 1915. SECRETARY AND GENERAL MANAGER.

The writer of the article to which the above criticism applies, having had an opportunity of reading through "Secretary and General Manager's" letter, forwarded the following reply to it.

SIR,—The criticism of my article, written by "Secretary and General Manager," though an able exposition of many aspects of the subject, appears in no way to destroy the validity of the arguments I introduced, or to show any good reason why the suggestions should not be adopted. The criticism seems to be more in the nature of an appeal for a release from the present statutory form, whereas the point of the article was that, as the responsible officer is compelled to give so much (in the statement and to the Board of Trade) and voluntarily gives much more in other directions, why cannot he embody all these things on the printed statement?

Thus, he asks: "Of what use is standardization?" But there is standardization; and all I ask is for an intelligent exposition of it. I suppose as far as actual value is concerned, the official at Cornwall cannot be expected to be guided by his *confrère* at Caithness; but he might take an intelligent interest in him. Otherwise, my critic might relegate "Field's Analysis" and similar works to the region of the unwanted, since the work tabulates concerns so far apart as Plymouth and Edinburgh.

If every secretary or accountant has to keep fully in mind the six commandments set out by "S. and G.M.," then truly he is betwixt the devil and the deep sea. Nos. 1 and 5 (apart or together) are in direct opposition to No. 4; for the printed statement of accounts cannot convince the shareholder that he is doing well, the prospective

one that he will do still better, and at the same time prove to the rating authority that the undertaking is stagnant or retrogressive.

As a matter of fact, the accountant will be up-against nothing more than at present if my suggestions were adopted. My critic must be perfectly aware that rating is more than a question of actual profit. I have not, however, suggested tampering with it. One of the chief points on which this depends—namely, the dissection of the capital expenditure, so as to get the statutable deductions—never appears in the printed statement. Regarding income-tax, there is very little in this argument; for ultimately the shareholders pay it, and whatever profit is shown, the official is called upon for considerable further explanations.

In fact, suspicion would be aroused by "hiding" things; and if information is freely given it often avoids the introduction of the expert. Much can be given; on the other hand, much can be legitimately withheld. I call to mind a case where a rating authority asked for a structural valuation of the works and mains of a large concern. They were told very politely that there was not one in existence, but every facility would be given their representative. In this particular case, nothing further was done.

On again reading my own article through, I cannot detect the suggestion of interfering with the system of preparation as mentioned by my critic. All I suggest is that the printed statement be more than a mere account of trading. It should be a printed monument of progress; good work well done; and nothing to be ashamed of.

May 29, 1915. "AN OCCASIONAL CONTRIBUTOR."

A Kindly Suggestion.

SIR,—A very large number of men from the various gas-works in the United Kingdom have joined His Majesty's Forces, and are now in the fighting line. As many of them have been wounded, and sent back to the hospitals (in various parts of the country), perhaps far away from their native towns, I would like to suggest that their names, rank, and number might be sent to the manager of the gas-works nearest the hospital.

I have no doubt whatever that the manager would be only too pleased to visit the wounded soldier, and send any information to his relatives. I have also no doubt that the soldier would be comforted and cheered by the visit.

Provan Gas-Works, Glasgow, May 25, 1915. JOHN WEBSTER, Manager.

Aspects of Co-Partnership.

SIR,—Replying to your correspondent, "A South Suburban Co-Partner," in your issue of May 18, I think he is only looking at the matter from a purely theoretical point of view. I will agree with him that, in theory, the system is ideal; but, in actual practice, I maintain it is a failure.

Is he aware—in the case of the Gas Light and Coke Company—that were the price of gas raised a further 2d., and maintained at this figure indefinitely, the co-partners would never receive another penny under the system, while the ordinary stockholders could still be receiving 4 per cent.?

To the best of my recollection (I have not my data at hand), in addition to the spirit of goodwill which it was to engender, it was put forward as a remedy for all labour troubles; strikes were to be things of the past; and a gentle harmony was to henceforth prevail in the gas industry.

Does he maintain that actual practice has justified this theory? Is it not a fact that strikes in various gas companies have only been averted by giving the men all they asked for, or, perhaps I should say, all that they expected? Does he maintain that "co-partnership" has deterred the men from asking for a single penny that they thought they could obtain?

I am accused of totally failing to understand the theory of co-partnership. I think not. But in any case that is beside the question, as I was only dealing with the practical side of it. I again assert that a system which expects a man to put in his last ounce without reward—after raw material has reached a certain level—is not an ideal system. No man will do it; and I for one do not blame him. To try and beat raw material would be like attempting to push back the sea with a garden fork.

The suggestion that any benefit that has been earned in the past should be an incentive to the workers to put forth their best efforts in the future (with raw material in an impregnable position) savours to me of the fantastic.

For your correspondent's suggestion of basing the system on the one factor of "labour cost in production," I am not, of course, responsible; and as he sets it up only to at once knock it down again it barely seems worth while. But from a theoretical co-partnership point of view (and here I take your correspondent on his own ground), would it not be true co-partnership to let the worker share with the proprietor in any advantage that might accrue from "new labour-saving appliances or other devices," even though it be beyond his control?

I cannot agree that the present system takes in "all the factors in production and distribution." How can it, when the present situation proves that raw material can completely wipe out the worker?

I am a practical business man, and I therefore relegate theory to where all other practical men relegate it. If "A South Suburban Co-Partner" is satisfied with theory and nebulous benefits, I have no wish to disturb his satisfaction; but it seems to me that it would much improve the present system if the workers' share were subject to a fixed minimum, as well as the proprietors' share. EDGAR O. GUTTRIDGE.

24, *Sandmere Road, Brixton, May* 26, 1915.

[Mr. Guttridge says a good deal about theoretical and practical considerations; but he has overlooked the very practical one advanced in the "JOURNAL" for May 25 (p. 443). It is impossible to condemn any system on conditions that are so vastly abnormal as those of the present, and have not arisen before since the introduction of co-partnership, nor are likely to arise again in our time, if the Allies succeed in their determination. Our correspondent is mistaken in supposing that the "proprietors' share" is subject to a fixed minimum. The model sliding-scale clause provides that "in respect of any year [or half year as the Special Act may prescribe] during any part of which the price charged by the company shall have been one penny or part of a penny above the standard price, the dividend payable by the company shall, in respect of such penny or part of a penny by which the standard price shall have been increased, be reduced below the standard rate of dividend by five shillings on every one hundred pounds of ordinary paid-up capital.—ED. J.G.L.]

REGISTER OF PATENTS.

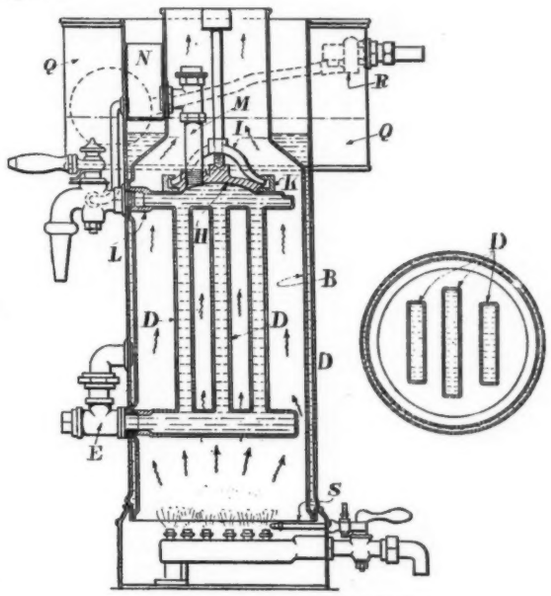
Geysers.

FOURNESS MANUFACTURING COMPANY, LIMITED, and MARTIN, J., of Manchester.

No. 7198; March 21, 1914.

This geyser or water-heater is so fitted internally as, without requiring to be taken to pieces, to allow of its being cleaned when the waterways or passages become charged with deposits of lime, &c.

A vertical sectional elevation and a sectional plan of the appliance are given.



Martin's (Fourness Company) Geyser.

The outer cylindrical sheet-metal casing is provided with a concentric inner sheet-metal shell—the two thicknesses forming between them a shallow water-way. Within, and central to, the casing are two hollow disc-like headers joined by a series of vertically disposed tubes D, opening into the interior of each header. The connection of the tubes and headers is such as to form a single fitment. The lower header communicates with the outer cylindrical water-way through a T-pipe C provided with a removable plug to serve as the sediment outlet. The upper header is provided with a removable cover, in the form of a disc H, held in position by any suitable means. One arrangement consists of a tripod I screwed against the disc, while the ends of it lie below an overhanging and upper flange of a channel-shaped ring K fixed to the header. The upper header is connected by a pipe L with the draw-off fitting—for hot water only, or for boiling water only. In the latter case the cover of the upper header will have the usual pipe M communicating with the expansion box N in the upper part of the heater.

The heater is furnished at its upper end with the usual supply cistern Q and ball cock R, and at its lower end with the burner pilot jet S and gas supply tap T.

When it is required to clear the tubes D and headers of any deposit, the cover H of the upper header is removed and a tool passed down the tubes—each tube being accessible from top to bottom, and the sediment being removed through the outlet pipe E.

Distilling Coal in Vertical Retorts.

JACKSON, W. J. M.; a communication from the INTERNATIONAL GAS DEVELOPMENT COMPANY, of New York.

No. 9849; April 21, 1914.

This invention relates to the manufacture of illuminating gas by the distillation of coal in substantially vertical retorts with the simultaneous production of water gas to mix with the rich hydrocarbons as the latter are distilled out of the coal, "whereby the tarry vapours are combined with the water gas and the rich hydrocarbons are fixed."

In known processes for the production of coal gas in vertical retorts,

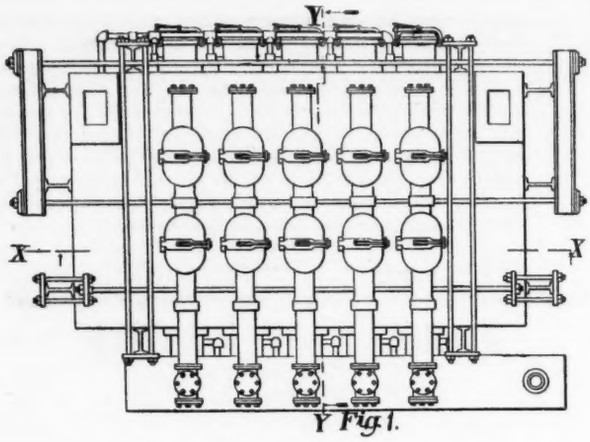


Fig. 1.

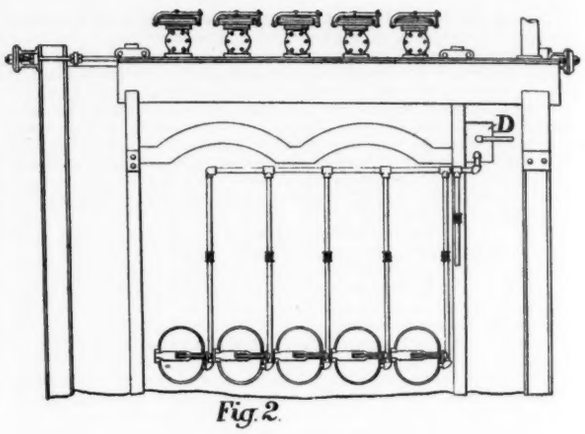


Fig. 2.

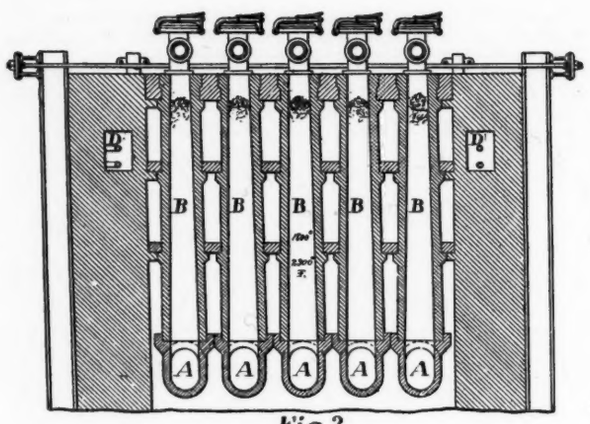


Fig. 3.

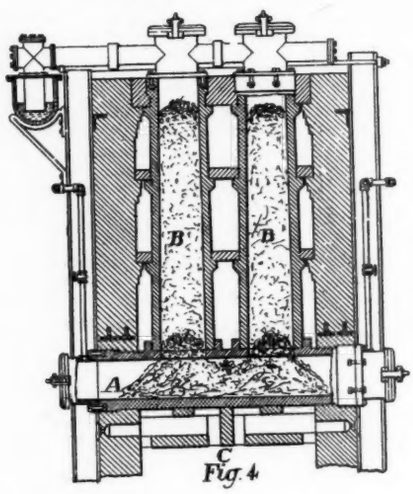


Fig. 4.

A Combined Vertical and Horizontal Retort Plant.

the patentees point out that the following may be cited: First of all, Duttenhoffer, in patent No. 2001 of 1904, proposed to supply steam at the beginning of, and during, distillation of the coal; and he assumed that the addition of steam passing through the distilling coal resulted in the formation of water gas, which mixed with the coal gas and prevented the formation of tar and carbon. "It is believed, however, that in this he was in error, because, as is now well known, the temperature of distilling coal is never sufficiently high to convert steam into water gas; and it would seem that in the prior process only water vapour would be formed." Second, it has been stated that steam may be admitted for facilitating the production of coal gas by passing it through the coke resulting from the distillation of the charge of coal, the effect of which is to sweep-out the volatile matter remaining in the interstices of the "residual matter," or coke, resulting from the distillation of the charge.

According to the method now proposed, the vertical retorts, each of which is provided with a body of coke at its base, are heated to a temperature not only sufficiently high to effect distillation, but also to raise the coke to incandescence. The retorts are then substantially filled with a charge of coal; and immediately afterwards, when the distillation has commenced, steam is admitted to the incandescent coke to produce water gas in sufficient quantities to prevent the deposits of carbon upon the inner walls of the retort—such admission being continued throughout the entire distillation. The result of this is that the lean water gas seizes upon hydrocarbons, such as benzol, &c., and mingles with the rich illuminants to produce a fixed gas—no adhering carbon being formed. Moreover, naphthalene is practically absent; its valuable constituents remaining in the gas. Incidentally, it is mentioned that the amount of steam admitted is not sufficient to materially reduce the illuminating power of the gas, nor to cool the incandescent coke to such an extent as to prevent the decomposition of the steam. Consequently, only a small quantity of coke is consumed, whereby its value as a bye-product is not appreciably impaired, as its production is not substantially lessened.

Fig. 1 is a top view of a bench for carrying the invention into effect. Fig. 2 is a front elevation. Fig. 3 is a vertical transverse section on the line X. Fig. 4 is a vertical longitudinal section on the line Y.

A are the corresponding parallel, side by side, independent horizontal retorts, in which the water gas is produced; and B the vertical retorts within which the coal is placed, and from which the gas is distilled. The vertical retorts open at their lower ends into the horizontal retorts, and there are two or more vertical retorts in communication with each horizontal retort. Below the retorts is a furnace C for externally heating the retorts which are surrounded by heating chambers, as shown.

In the side walls are spaces or chambers D, through which pipes pass for introducing the steam employed in the production of the water gas. Each side wall of the bench is provided with a superheater chamber, and the steam-pipes are so arranged as to render it convenient to deliver the superheated steam into both ends of the horizontal retorts.

The ends of the horizontal retorts have suitable doors adapted to be firmly locked in closed position and conveniently opened when desired, and the upper ends of the vertical retorts are equipped with pipes (above them) with doors adapted to be securely locked in the closed position and opened when desired. The pipes for the vertical retorts connected with each horizontal retort are connected by piping and with the hydraulic main, so as to conduct the gas from the upper ends of each set of vertical retorts to the hydraulic.

During the operation of the apparatus there is maintained within the horizontal retorts a bed of incandescent coke at the foot of each vertical retort. Before the vertical retorts are charged upon the incandescent coke the vertical retorts are brought to a temperature ranging from 1800° to 2300° Fahr.—it being unnecessary to exceed this upper limit. The charge of gas coal (say, 600 lbs.) is thereupon introduced into each vertical retort, at one operation. It substantially fills all that portion of the vertical retorts up to a zone therein (near the roof portion of the bench) at which the temperature is insufficient to decompose the newly-made gas, "whereby lamp-black would otherwise be produced." In other words, the distilling coal occupies all those portions of the vertical retorts exposed to the "proper" temperature to effect the distillation of the coal, and the gas arising from the distilling coal is then conducted through a cooler zone on its passage to the hydraulic. The beds of distilling coal remain stationary except for the natural settling-down during distillation.

As already noted, the first effect of dropping the charge of coal into the highly-heated vertical retorts, and upon the body of incandescent coke contained therein, is to produce an instantaneous flush of gas, which passes off into the hydraulic main. Distillation then proceeds more uniformly, and, immediately after the first flush of gas, steam is admitted at both ends of the horizontal retorts. The function of this steam is to produce water gas, which is admitted in such limited amount that it will not cut down too much the candle power of the coal gas, and yet will have the protective effect contemplated by the invention. It has been found that the admission of an amount of steam sufficient to add to the distilling coal gas a quantity of water gas ranging from 10 to 15 per cent. by volume will suffice for the purpose.

In ordinary coal-gas practice, it is remarked, part of the gas evolved from the coal comes into contact with the heated walls of the retort, whereby certain of the rich hydrocarbons are decomposed; the carbon adhering to the inner walls of the retort in the form of retort carbon, and the hydrogen passing off as "blue" gas. Certain other portions of the hydrocarbons pass off in the gas—among them many high illuminants, such as benzol, &c. These high illuminants, cooling to a certain temperature, are condensed and go into the tar—thus becoming lost to the final gas product. By the introduction of water gas, as described, this lean gas seizes upon these hydrocarbons in the process of their transition into carbon, inasmuch as the lean gas has a great affinity for the rich hydrocarbons; and, consequently, retort carbon is not formed. Moreover, the water gas admitted is thus carburetted, so that the volume of the mixed gas is increased without material diminution of its average candle power. That the water gas does seize

these hydrocarbons is proved by the fact that no retort carbon is deposited on the retort walls. The water gas also combines with certain rich illuminants passing off with the gas—such as benzol, &c.—as they also have an affinity for each other. This combination produces a fixed gas, and these rich hydrocarbons are not lost in the tar. Naphthalene is practically absent; its valuable constituents remaining in the gas, instead of being segregated out therefrom. The candle power of the gas may be raised still further by the admission of oil, oil vapour, or the like, into the vertical retorts; but, except where a gas of more than usual candle power is desired, this will not be necessary.

Gas-Meters.

HIBBERD, C. E., and GOAD, F. L., of Edinburgh.

No. 10,277; April 25, 1914.

This invention has for its object to provide an improved method whereby the diaphragms in conjunction with the measuring chambers of gas-meters may be secured in "a simpler and more efficient" manner.

It has hitherto been proposed, the patentees state, to attach the diaphragm by clamping it between a co-acting U-shaped carrier and clamping rings. In some constructions the sides or legs of the U were arranged at right angles or inclined at a considerable angle to the axis of the diaphragm; while in others, in which the legs were substantially parallel to the axis, and the parts were assembled by movement parallel to this axis, screws or like fastening devices were required to secure the diaphragm in position.

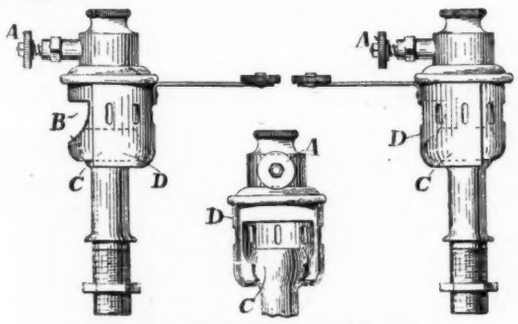
According to the present invention, however, the sides or legs of the U portion of the clamping ring (in some cases formed integral with the measuring chamber) are arranged substantially parallel to the axis of the diaphragm, and "so that the diaphragm may be clamped by an axial movement of the ring without the necessity of providing screws or other like fastening devices to secure the parts in position."

Inverted Incandescent Gas-Burners.

EDWARDS, A. N., of Farringdon Street, E.C.

No. 11,000; May 4, 1914.

This invention has for its object "to improve the type of inverted incandescent gas-burner known as the 'lift-off' burner, which comprises two coupling-elements one of which is a socket having a side opening into which the head or bolt constituting part of the other coupling-element is introduced, and to apply this same principle to gas-pendants generally."



Edwards' Lift-Off Incandescent Burner.

The fitting (as shown) is provided with a gas-regulator A (of known construction). The part which constitutes the subject-matter of the invention is the curved plate D, which is carried by a ring engaged with the socket or the fixture so that it can be turned upon the fixture to bring the plate in front of the opening B or away from it as required. The wall of the socket is provided with slotted perforations, and the cover D is provided with similar perforations.

When the cover is in one position the opening B is free, so that the head C of the coupling-element can be dropped into place or removed out from the socket. But as it is not always desired to admit the volume of air which the opening B would permit to enter the burner, the cover D is provided to be moved into position over the opening so that the air-admission can be regulated. The plate is provided with an operating-handle whereby it can be slid round the socket so as to entirely close the opening B except in so far as the perforations allow air to pass through.

It will be seen that when the cover is in the closed position, accidental displacement of the coupling-element from the socket cannot take place; so that, in addition to the cover serving as an air-regulator, "it has the further function of locking these two members against accidental disconnection."

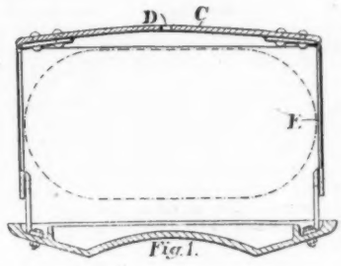
Vertical Gas-Retorts.

TOOGOOD, H. J., and ROBERT DEMPSTER AND SONS, LIMITED, of Elland.

No. 11,178; May 6, 1914.

The patentees remark in their specification: "It has hitherto been the general custom to supply coke breeze to vertical retorts before the coal, in order to prevent the coal passing below the carbonizing zone. The collecting, storing, and separate charging of this breeze naturally adds considerably to the cost of the process, and contributes to the dust and dirt of the retort-house. The object of this invention is to avoid the expense and dirt of breeze handling by substituting for breeze an improved form of mechanical support for the charge of coal, which mechanical support shall be as free as possible from working parts, so as to obtain great reliability, in spite of the heat and dirt to which it must be subjected in use."

According to the invention, the table, which is supported on the bottom lid of the retort, is so pivoted or hinged to the lid that its withdrawal and reinstatement can be readily effected without putting undue strain on the lid itself—the travel of the table on the opening of the lid being so guided or limited that the table does not pass through the falling hot coke, and so much strain is avoided. Further, the hinged legs of the table are so arranged that they do not impede the fall of the charge, which passes out between the table and the lid—the table and lid remaining at opposite sides of the retort when the lid is open.



Toogood's (R. Dempster and Sons) Vertical-Retort Coal-Support.

Fig. 1 is a sectional plan taken on the line A B of fig. 3. Fig. 2 is a vertical section through the minor axis of the retort—showing the stop or table in position within the closed retort. Fig. 3 is a similar section, but with the lid in the open or discharging position; the arrow indicating the descent of the charge, which takes place immediately after the opening of the lid and consequent withdrawal of the table.

The lid (of known type) is provided with lugs at each end. The table C is preferably rounded or curved on the top, and provided with an aperture D to admit steam to the charge if desired. The legs E of the table are pivoted to the lugs. A guide F on the retort mouthpiece G terminates in a stop H, which limits the external and descending movement of the table.

On opening the lid, the table is drawn (or falls by gravity) out of the retort, and comes to rest against the stop. The coke then falls out between the legs of the table, "which in the usual tapered elliptical retort will form no obstruction to the discharge of the coke, as the legs may be at a distance apart greater than the major cross-sectional diameter of the carbonizing portion of the retort." The dotted line in fig. 1 represents the maximum cross section of the retort, from which the charge descending vertically would fall through the space enclosed by the table and lid.

After discharging, the stoker pushes up the table with a rod, which action causes a slight movement of the lid and brings the table to rest against the inside of the mouthpiece—as shown in dotted lines in fig. 3. The guide above the stop serves to guide the table to and from the retort. The closing of the lid suffices to complete the return of the table into its operative position.

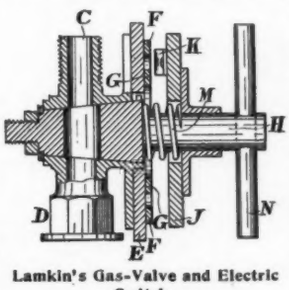
Gas-Valves with Electric Switches.

LAMKIN, A. E., of Brighton.

No. 17,396; July 22, 1914.

This invention relates to gas-valves and electric switches, with the object of providing a combination so that when the gas is turned on it may be lighted electrically in a circuit adapted to be closed directly or indirectly by the switch. The combination is of a manually operated gas-cock and a disc on the cock carrying two annular contacts; a spring-pressed insulated disc on the spindle of the cock; and a contact on the latter disc adapted to close the electric circuit between the contacts on the first-named disc.

The manually operated gas-cock is shown with an inlet C and outlet D; while on the body of the cock is mounted a disc E, of vulcanite, carrying two annular contacts F G. On the spindle H of the cock is mounted a vulcanite disc J carrying a contact K adapted to be pressed against the action of the spring M to complete the circuit between the contacts F and G. N is a handle on the spindle by which the cock is turned. When it is desired to turn on the gas the cock is moved to the "on" position, and the disc J pressed against the spring M until the contact K touches the contacts F and G.



Lamkin's Gas-Valve and Electric Switch.

MISCELLANEOUS NEWS.

BIRMINGHAM GAS CHARGES.

A Further Increase in Price Necessary.

At a Meeting of the Birmingham City Council to-day, the Gas Committee will submit a report in which they state that, as foreshadowed by them some time since, it has become necessary further to increase the price of gas. The Committee are compelled to ask for the advance in consequence of the large increases in the price of gas coal for the next twelve months. The revenue from residuals is also reduced, especially in the case of tar; while the advance in wages recently sanctioned by the Council will further reduce the surplus at the end of the year. After giving the whole matter most careful consideration, the Committee recommend that prices be increased 3d. per 1000 cubic feet, to take effect from the June reading of the meters. They also recommend that the quantity of gas supplied through prepayment meters be reduced as follows from the same time: With gas fittings and cookers free, from 35 to 31 cubic feet per penny; with cookers only free, from 39 to 35 feet per penny. The price of gas supplied through prepayment meters was not altered at the time of the readjustment of the scale of charges in March.

In connection with the supply of labour for munitions of war, arrangements have been made to release some 200 men from the Gas Department for service with firms employed on Government work. As one-half of these men belong to the fittings department, it may be necessary to suspend during the war the burner maintenance department, with the exception of public institutions. &c. Arrangements have been made with the Birmingham Master Gas-Fitters' Association to do more gas-fitting work for the department, to assist in tiding over present difficulties. The record output of gas up to December last—namely, 267½ million cubic feet—was exceeded on two occasions during that month. First during the week ended Dec. 16, when the output was 268½ millions; and again during the following week, when the output was 281½ millions. During the latter week, also, the maximum daily output, which previously stood at a little over 43 millions, was passed on three occasions.

The Committee will submit a statement of accounts for the year ended March 31, showing a surplus of £37,350 to be paid to the Finance Committee in aid of the borough rate of the city, to which must be added £3226 interest on the reserve fund.

The following comparative statements for the years ended March 31, 1914 and 1915, show the results of the years' trading:—

	1914.	1915.
Gas sold (cubic feet)	9,551,783,000	9,887,664,900
New services laid	7,522	5,698
Cooking and heating stoves sold	1,051	1,051
Total number of cooking and heating stoves on hire at March 31	52,812	63,985
Total number of cookers supplied with prepayment meters at March 31	86,116	91,841
Total number of prepayment meters fixed at March 31	94,442	99,101

Commenting on the report, the Finance Committee state that they are fully in accord with the present proposal of the Gas Committee to increase the charges for gas 3d. per 1000 cubic feet.

BIG INCOME-TAX REFUND.

Profits on Municipal Undertakings.

The announcement was made last week by Mr. James Hill (the Chairman of the Finance Committee) that a cheque for £56,270 has been received by the Bradford Corporation from the Inland Revenue authorities, being the amount of income-tax refund over a period of more than twenty years. During the whole of this time a dispute has been going on between municipal corporations and the Inland Revenue Department with regard to the basis on which rebate of income-tax should be allowed on municipal undertakings.

A report on the subject, prepared by the City Treasurer (Mr. F. Ogden Whiteley), states that several cases have been fought in the Courts, in the last of which (known as the Leeds test case) the House of Lords decided in favour of the Crown on certain points, although many principles contended for by local authorities were confirmed in the judgment. The income-tax, Mr. Whiteley points out, has been paid under protest each year; so that in the event of a settlement of the dispute favourable to the Corporation the refund should be for the whole period, and not for the customary three years only. Briefly, the case put forward for the Corporation was that they should be allowed to set against the profits of certain undertakings the losses incurred in others; income-tax being accordingly paid on net income only. The Board of Inland Revenue have maintained, on the other hand, that the various undertakings are separate entities, and that the Corporation must pay tax on their profits, and also hand over income-tax deducted when paying interest on loans in respect of non-productive departments. A test case was eventually fought by the Municipal Corporations Association; and the House of Lords gave a decision in 1913 the effect of which is broadly that for income-tax purposes the Corporation are to be regarded, not as one person, but as two persons—one acting as a municipal authority and the other as a sanitary authority. Within these two groupings the Corporation are now entitled to set off the balance of any taxed profits on their trading undertakings against the interest on their non-trading departments, and to retain to that extent the income-tax deducted when paying their interest on loans.

Mr. Hill complimented Mr. Whiteley on the successful termination of the protracted negotiations.

MIDDLESBROUGH GAS-WORKS ADMINISTRATION.

It was stated in the course of the proceedings at a recent meeting of the Middlesbrough Corporation Gas and Electricity Committee that the net profit on the gas-works for the past year was £3624; and high appreciation was expressed by the Chairman (Mr. J. Calvert) of the technical ability displayed by Mr. David Terrace (the Engineer and Manager) and Mr. Blincoe (his Assistant) in the control of the gas-works and the utilization of coke-oven gas for town supply.

Reference was then made to the minutes of a Special Sub-Committee of Inquiry concerning the administration of the gas-works, which had been sent back by the Council for further investigation. The Chairman said he had had further interviews with Mr. Terrace and Mr. Blincoe concerning "the irregularities at the gas-works." The one new point which transpired was a statement by Mr. Terrace that he was financially interested in, though not actively associated with, the management of the Dunblane Gas-Works, for which works a Middlesbrough Corporation draughtsman did about a fortnight's work.

The further discussion of the matter concluded with the Committee re-affirming (with the addition of a reference to the Dunblane incident) the findings of the Sub-Committee to the effect that irregularities had occurred, that it was inadvisable for the gas-works officials to be connected with other similar undertakings, and that they should accept their expressions of regret and assurances that it would not occur again.

An amendment was moved by Mr. Scholes and seconded by Mr. Turford, that Mr. Terrace and Mr. Blincoe be asked to tender their resignations; but it was afterwards withdrawn.

The "Middlesbrough Standard" says: "At the next meeting of the Middlesbrough Gas and Electricity Committee, Alderman Poole is to move a resolution that they should go into the whole matter of the management of the gas and electricity works, and see if they cannot dispense with some of the higher officials—especially as the Corporation are buying a lot of gas and electricity."

STOKE-ON-TRENT GAS MANAGERSHIP.

The Question of Salary.

There was some discussion at the quarterly meeting of the Stoke-on-Trent County Borough Council last Thursday with regard to a notice of motion standing in the name of Alderman Mitchell (the Chairman of the Gas Committee) and countersigned by 33 members, as to the appointment and salary of a Chief Engineer and Manager of the gas undertakings of the Corporation. The notice of motion was: "That the resolution of the Council passed on April 29, 1915, that an advertisement be issued for a Chief Engineer and Manager of the gas undertakings of the Corporation at a commencing salary of £400 be rescinded, and that the following resolution be substituted therefor: 'That an advertisement be issued for a Chief Engineer and Manager of the gas undertakings of the Corporation at a commencing salary of £500, rising to £700 per annum, with coal and light free.'"

Alderman Mitchell, in moving the resolution, said the Committee were compelled by hard facts to take this action, because it was not possible to obtain a man with the requisite knowledge, experience, and ability for the sum passed at the last meeting of the Council. Inquiries had been made, and they were unable to find smaller works than theirs that did not pay higher than £400 a year. The capital invested in their undertaking was about half-a-million pounds. If these important works were in charge of a private company, would the company hesitate to pay the salary proposed by the Committee? All of them would agree they would not. It was of extreme importance that a person who had such great responsibility placed upon him should be a man of the highest character and honour. ["Hear, hear."] The figure that was paid in salaries for the management of these works three or four years ago was £1750. To-day they proposed to pay in the whole of the salaries for management a sum of £850.

The motion, without the last words, "with coal and light free," was carried by a large majority.

NEWBURY CORPORATION GAS UNDERTAKING.

The annual report of Messrs. Wood, Drew, and Co., on the working of the Newbury Corporation gas undertaking for the year ended March 31, together with the balance-sheet and working statement, was laid before the Council at the last meeting. A gross profit was shown of £4019, which compared with £3572 for the preceding year. The surplus available for disposal was £1017, against £428; and out of this the Committee recommended that £300 be carried to a sinking fund depreciation account, £400 to the district fund, and the remaining £317 to the working balance. They further recommended that the discount of 4d. per 1000 cubic feet for prompt payment be reduced to 2d., in view of the certain increase in the price of coal during the next financial year. The quantity of gas made was 83,599,000 cubic feet, which was an increase of 3,734,000 feet on the previous year.

In presenting the report and accounts, Alderman Lucas said the Committee agreed with him that they were eminently satisfactory. The make of gas per ton of coal carbonized had been 11,365 cubic feet. This was an increase of 249 feet per ton, which was largely attributable to the adoption of mechanical charging. The financial position was very favourable, and their hearty thanks were due to the Manager (Mr. W. R. Davey) and the staff for the loyal and efficient conduct of the business of the undertaking. Mr. Stradling agreed that such excellent results could not have been obtained except by constant supervision and a firm control of expenditure. He, however, suggested that the Committee should contribute £500 to the rates, instead of the £400 recommended; and Alderman Lucas said he would be prepared to accept this alteration.

LANCASTER CORPORATION GAS-WORKS.

In his report upon the working of the Lancaster Corporation gas undertaking for the year ended March 31, Mr. Cecil R. Armitage (the Engineer and Manager) says the total receipts were £32,335, and the expenditure £23,444, leaving a gross profit of £8891. Out of this sum, £2850 has been paid for interest on stock and mortgages, £2259 has been added to the redemption fund, and £930 has been paid for income-tax. The net profit is £2850, which is to be allocated to the borough and reserve funds, the latter fund having been depleted this year. The total sales of gas, exclusive of that supplied to public lamps, were £19,682, a decrease of £37. Residuals realized £10,626, equal to 82·98 per cent. on the cost of coal. The average price received per 1000 cubic feet of gas sold was 1s. 10·17d. The total cost of coal was £14,327 14s. 6d., an average of 13s. 5·63d. per ton, as against 13s. 0·55d. in the preceding year. Nothing has been added to this account during the past year; but £1092, the cost of new mains, services, meters, and prepayment stoves, has been charged direct to revenue account. The unaccounted-for gas was 5·58 per cent. The abnormal increase is due to reading meters fifteen days earlier, as required by the Local Government Auditors. The net cost of gas—10·43d. per 1000 cubic feet sold—and the return for residuals—82·98 per cent. on the cost of coal—will still compare most favourably with other gas undertakings. The works and mains have been maintained in an efficient condition; and further extensions will have to be made to the carbonizing plant next year.

The Borough Accountant (Mr. W. Clough), reporting on the accounts, says the whole of the net profit had been transferred to the borough fund in due course; but as the Gas Committee, in the purchase of coal, were already committed to an increased expenditure of £2000 beyond the amount put down when framing the estimates, he recommended that £1100 be re-transferred from the borough fund to the gas account, in order in some measure to meet this excess.

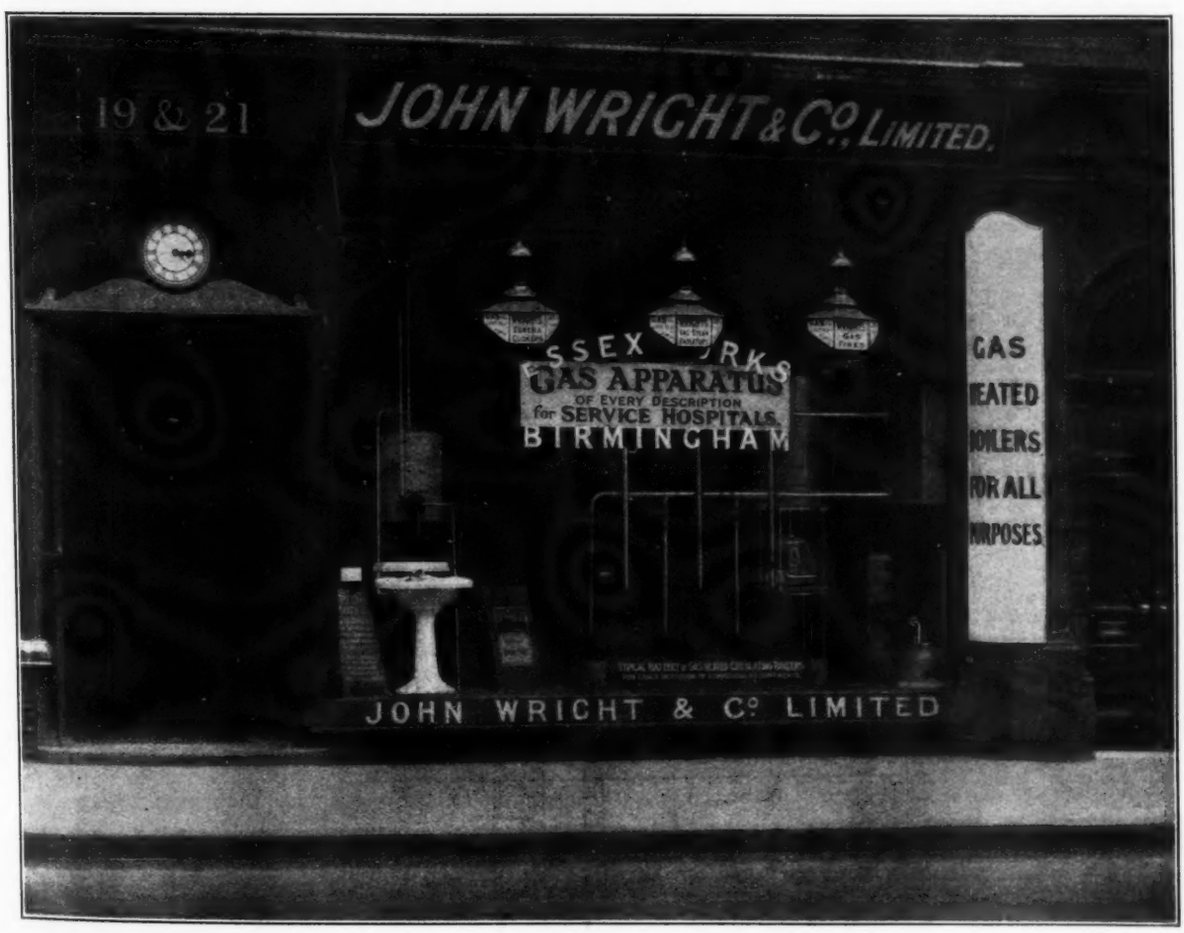
THE PROPOSED GERMAN NITRATE MONOPOLY.

In another part of the "JOURNAL" will be found a communication from a Dutch correspondent on the subject of the proposed nitrate monopoly in Germany. The following remarks on the same matter appeared in the "Chemical Trade Journal" for the 29th ult.

Active opposition in all circles of the German chemical industry has been developed against the Government Bill which proposes to authorize the Federal Council to introduce a monopoly in certain nitrogenous products, and which is now under the consideration of a Special Commission of the Reichstag. The opposition is not directed against the attempted rendering of the country independent of external sources of supply, but against the means whereby this object is sought to be accomplished. It is pointed out in this connection that the suggested monopoly is based practically on the favouring of the bulk production of cyanamide, the works for the output of which, according to the Bill, are to be guaranteed against being unremunerative after the war. The Association for the Protection of the German Chemical Industry submits that this purpose could only be achieved if the sale is regulated in the first place in a definite manner, and consequently the production placed under certain restrictions. The cost of production of the works operating the most unfavourably would have to determine the course of sale prices; and thus any incentive to make further technical progress would be absent. The first to suffer would be the agricultural industry. Chilian nitrate would disappear from the German market through the monopoly, and would be thrown on foreign markets, thus depressing prices, so that the world's prices for Chilian nitrate would be less than those of the German monopoly, which is to be assured of a definite financial return. The chemical industry, the munition and explosives industry, and the coal-tar colour industry would also be seriously affected; and it is considered that the Commission of the Reichstag should therefore reject the Bill.

In other circles, more particularly by the Badische Anilin und Soda Fabrik, it is pointed out in a memorial that the production of nitrogen is in course of great extension. The new plant of this Company for the synthetic production of ammonia will be able to furnish more than half the quantity of nitrate hitherto obtained from abroad; and the capacity of extension of the plant is unlimited, and completely independent of other countries. Other chemical undertakings are also declared to be increasingly occupied on the production of nitrate; so that the danger of any shortage for industry or agriculture seems out of the question. This opinion is also shared in the wider circles of industry and by the representative Associations, including the Frankfort Chamber of Commerce and the Seniors of Berlin Merchants, the latter of which submits that the monopoly would mainly facilitate a single process, concerning the capacity of development of which opinions still widely differ. It is further contended that the object sought by the monopoly can be attained in other ways, and that the present time is an inappropriate one for the discussion of the Bill by the Reichstag.

Oldham and a "Coal Ring."—At the last meeting of the Oldham Gas Committee, the Chairman (Alderman H. Wilde) reported that he and Mr. Arthur Andrew (the General Manager of the Gas and Water Departments), had attended a conference in London of the principal gas undertakings in the country. He (Alderman Wilde) confessed that he was disappointed. His view was that steps should be taken by the Government to regulate coal prices; but the conference had mainly dealt with the problem of obtaining the coal, and not with prices. People in the South of England had been much harassed to procure coal at all. There was a strong "coal ring," and the situation had been exploited.



SOUTH AFRICAN LIGHTING ASSOCIATION, LIMITED.

Effect of the War on Consumption—Use of Colonial Coal.

The Ordinary General Meeting of the Association was held last Wednesday, at the London Offices, No. 90, Cannon Street, E.C.—Sir DANIEL F. GODDARD, M.P., in the chair.

The SECRETARY (Mr. William Cash, F.C.A.) read the notice convening the meeting, the minutes of the last meeting, and the report of the Auditor. The report of the Directors and the statement of accounts were taken as read.

The CHAIRMAN said that the most important point in the report which was before the shareholders was to be found in the second paragraph, which told them that the year had not been quite so successful as many of those which had preceded it, and, in consequence of the war, had shown a little reduction in the consumption of gas. This was, of course, entirely beyond the control of the Company. As regarded the manufacture of gas, he thought they had in many respects done quite as well as before; and a few remarks about the working of the undertaking would demonstrate this to the proprietors. The reduction in output of gas at Port Elizabeth was 4,746,000 cubic feet—a falling-off due to several causes, all arising out of the war. There was the feather industry, which had, he supposed, been practically destroyed for the time being. This was a very large industry; and it had gone. Then, of course, there was the revolution in South Africa just at the beginning of the war; and since that there had been the war in German South-West Africa. The effect of it all had been to kill business in Port Elizabeth; and, in addition to this, the best markets for the trade in wool, mohair, skins, and things of this kind were German, French, and Russian; and these were now altogether out of the question. They were practically closed; and there was very little shipping to take the produce from the country. These were the general causes of the reduction. They had led people seriously to economize in the use of gas, as could be seen from the figures available. Then there was another reason. They were told by their Manager that something like 3000 of the best workers in the district had gone to the front. When it was remembered that the population was only about 20,000 whites, it would be seen that a reduction of 3000 of the best workers constituted a very serious interference with the industry of the town. The leakage account was really very satisfactory; it was the best they had had for many years. Certainly, it was the best since the public lights were taken away from them and given over to electricity. When one came to compare the leakage by percentages, it did not look so favourable; but with a reduced output, the percentage of leakage was really no criterion. The amount actually lost in the past year was 6,171,000 cubic feet, as against 7,180,000 cubic feet in the preceding twelve months; so that practically 1,000,000 cubic feet had been saved in leakage, though this did not show in the percentage. The number of consumers had not materially diminished; and this, he thought, was a good feature, because it gave them hope that when these unusual circumstances had come to an end people would still continue to use gas. They had only lost 51 consumers in Port Elizabeth during the past year. The point, however, was that the average consumption per consumer had dropped to 12,672 cubic feet; whereas a year ago it was 13,532 feet. This was a considerable falling off, when it was multiplied by the total number of consumers. It was one of the peculiar features in connection with the Company. Going back a short distance in the history of the undertaking, it would be found that the consumption ten years ago averaged 34,000 cubic feet per consumer per annum; while now, as he had stated, it was only 12,672 feet. He might, for one thing, mention cookers. They had still got a large number of cookers in use, but they were not consuming so much gas. With regard to the question of coal, it would be found that the make of gas per ton was somewhat less on the present occasion. That the yield had not been so good was owing to the fact that they had been using a very large proportion of Colonial coal, which, however, was a great deal cheaper. Some considerable economy was thus effected in the cost of coal, in spite of the fact that not quite so much gas per ton was produced. The Directors were glad to find the native Burnside coal was doing so well, and that its use had proved on the whole a very satisfactory change. In Grahamstown they were employing practically nothing but local coal. He did not know, in regard to the working generally, that there was much else to refer to. The purification charge was very low; but it was sufficient. The output at Grahamstown had increased, compared with the previous year, by 327,500 cubic feet; and the number of consumers had also slightly increased—there being 47 new ones. The cost of coal in Grahamstown last year was less per ton than for the previous year. The saving had been effected by using almost exclusively local coal. The returns for tar were very satisfactory. A new gasholder was being built at Grahamstown, which was a very necessary addition. At the present time, they were sending out over 75,000 cubic feet of gas on some days in the year; and the total storage capacity was only 60,000 cubic feet. This was not an economical position to face; and as soon as they got the new holder to work, there would, he thought, be a saving. It would be observed that, on account of the loss of profit that had been experienced, it had been necessary to raise the price of gas at Port Elizabeth. The charge was reduced at Grahamstown last year; but at Port Elizabeth, as from April 1 last, they had been compelled to increase the price by 5d., to 7s. 8½d. net per 1000 cubic feet. With regard to the accounts, the net decrease in profits, as compared with the previous year, was £1360 at Port Elizabeth and £738 at Grahamstown. This, as he had pointed out, was mainly due to the drop in consumption. If the figures were analyzed, it would be seen that none of the decrease was due to bad working; and the same remark applied to Grahamstown. There had been a new Colonial income-tax; and, of course, there was the reduction of 10d. per 1000 cubic feet in the price of gas at Grahamstown, which had cost the Company £550. He very much regretted that, in consequence of all this, the Board had had to reduce the dividend; but

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it was an act of prudence that they should do so. There would still be something to add to the amount to be carried forward, though not much. The dividend recommended was the most that they could fairly pay; although, of course, there was some money which was carried over from year to year. The staff in South Africa were quite willing to have some reductions in their salaries on account of the present bad times, though the matter was not quite adjusted yet. The staff in London, the Secretary, Engineers, and Directors had all agreed to a reduction of 20 per cent. in their fees on the same account; and, as he had said, this example would be followed, though he was not quite sure to what extent, by the officers in South Africa. This was for the current year, and did not appear in the present accounts. He concluded by moving the adoption of the report and accounts.

Mr. ANDREW L. DON formally seconded the motion.

Mr. ALEX. MITCHELL said the shareholders regretted, as the Board did, the position in which they were all unfortunately placed through the war. The remarks of the Chairman had, however, proved completely that the falling-off was entirely due to the war and its effects. From the full explanations that had been forthcoming, he thought the proprietors should be satisfied, and were satisfied, that the business was as well managed as it could be in the circumstances; and they could only hope for better times, not only for South Africa, but for their own country and every country involved in this terrible war. With reference to the falling-off in consumption, he could endorse what the Chairman had said about the effect of the 3000 workers leaving Port Elizabeth for the front, because in the town in which he lived the influx of a large number of military men had made a great difference in the gas consumption. One very satisfactory point was that the number of consumers had not been reduced to any extent. If it was merely a question of the consumption per customer going down, they might trust and believe that it would increase again when the war ended and business returned to its normal state. South Africa must have a future before it, as the other British Colonies had. The thanks of the shareholders were due to those in charge of the undertaking for their self-denying ordinance.

The resolution was then carried unanimously.

The CHAIRMAN moved the declaration of a dividend at the rate of 8 per cent. for the year, less the interim payment of 3½ per cent., and subject to income-tax at the rate of 1s. 6½d. in the pound. This, he pointed out, was 1 per cent. less dividend than had been paid for the previous year, and for some time. The 1s. 6½d. income-tax was on the whole year's dividend.

Mr. HENRY WOODALL seconded the proposition; and it was at once agreed to.

Thereafter, the re-election of the retiring Director (Mr. Don) took place, on the proposition of the CHAIRMAN, seconded by Mr. JAMES MACALISTER.

The Auditor (Mr. P. D. Griffiths, F.C.A.) was also re-appointed, on the motion of Mr. G. CRISPE WHITELEY, seconded by Mr. HENRY WOODALL (of Messrs. Corbet Woodall and Son, Consulting Engineers to the Association).

Mr. WHITELEY then proposed a hearty vote of thanks "to those in authority and those who had followed authority" for the excellent work of the past year. The shareholders were not, he said, at all surprised at what the Chairman had told them; and they could only marvel that the difficulties which had arisen had been so well surmounted. That the dividend should be as good as it was, and that things should not be worse than they were, was a source of congratulation to them all. For this, their thanks were due to the Chairman and Directors and the members of the staff both in this country and in South Africa. He thought the present troubles, when they were over, might give them an opportunity of strengthening the position of the Company; and, like some other companies, he believed the present trials and difficulties might prove to be for their benefit, if they only knew it. At any rate, let them hope it would be so, and that all would be well in the future.

Mr. F. R. SMITH seconded the proposal; remarking that their thanks were due to the Board and officials for what they had done—especially as they were shouldering some of the burden that was falling on everyone at the present time.

The vote having been heartily accorded,

The CHAIRMAN returned thanks on behalf of himself, his colleagues, and the staff. It was, he said, gratifying to hear that the shareholders were satisfied with what had been done for them; and the resolution was specially valued because the Board believed it was an encouragement and help to those who were working in South Africa, who did not come into personal contact with the shareholders, and so could not witness their appreciation of the work that was being done.

Coventry Gas Profits Reduced.

A very substantial reduction in profits, as compared with those of a year ago, is shown in the result of the twelve months' trading of the Coventry Corporation gas undertaking. The accounts to March 31 state that there is an available surplus of £5084, as against net profits in the previous year of £12,276. Out of the latter amount, the sum of £5000 was voted in relief of the rates, and £7000 was transferred to the sinking fund. This year the Committee are recommending to the City Council that the whole of the available surplus be carried forward to the next account. The reduction in profits is principally due to the increased costs and to the exceptional conditions brought about by the war. In 1913, the department showed net profits on the year's trading of £20,298, and the rates benefited to the extent of £5000, while £10,000 was transferred to the sinking fund and £5000 placed to reserve. A short time ago the Committee recommended that the scale of charges for gas should be increased by 4d. per 1000 cubic feet, owing to the higher cost of coal and the extra amount that was being paid in wages; but the Council agreed to an advance of 2d. It was then stated by the Chairman of the Committee that it was most likely that within a short period they would have to make application to the Council for a further increase in the scale.

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ENEMY PATENT RIGHTS.

By virtue of the provisions of the Patents, Designs, and Trade Marks (Temporary Rules) Act, 1914, any person may apply to have any of the hereunder patents revoked or suspended, providing that such person applying can satisfy the Board, or any person whom they may appoint for the purpose, that the patentee or licensee is the subject of a state at war with His Majesty, that such person applying intends to manufacture, and "that such revocation is in the general interests of the country or of a trade." The list has been compiled by Messrs. Hughes and Young, Patent Agents, Nos. 55 and 56, Chancery Lane, London, who will furnish readers with any further information required.

28,389 (1913).—Berlin-Anhaltische Maschinenbau Akt.-Ges., "Purifying gas."
28,716 (1913).—Deutsche Continental Gas-Ges., "Valves; valves controlled from a distance."
28,832 (1913).—J. Ephraim, "Separating gases."
28,893 (1913).—Alpine Maschinenfabrik Ges., "Gas-producers."
28,942 (1913).—K. Jahn, "Heating by hot water; hot water supply."
304 (1914).—Dellwik Fleischer, "Gas-producers."
793 (1914).—Semmler, "Internal-combustion engines; heating water."

BIRMINGHAM WATER ACCOUNTS.

In the accounts of the Birmingham Corporation Water Committee, to be presented at to-day's meeting of the City Council, the water rates and charges show a total increase of £5601, equal to 1·70 per cent., against an increase of 2 35 per cent. last year. The domestic rental has increased 1·51 per cent. The revenue account shows a gross profit of £217,101, against £221,733. The charges on capital account, in the profit and loss account, amount to £306,685. This includes a provision of £37,298 for redemption of debt and extinction of annuities, being £2761 more than last year; £160,000 loans having come into charge for redemption for the first time. The deficiency for the year is £88,481, against a corresponding sum of £80,467 a year ago. The account includes £11,599, special expenses due to the war; and had it not been for this item, the deficiency on the year's working would have shown a reduction of £3585. A sum of £65,000 on account of the deficiency has been received during the year from the borough fund and rate account, leaving £23,481 to be dealt with.

The Committee do not propose to make any transfer under the powers of capitalization in section 22 of the Birmingham Corporation Water Act, 1902, nor to ask for any supplementary contribution from the borough fund and rate account of next year, but to carry forward the whole balance as a charge on the income of the department. Their reason for taking this course is that under the revised scales of water-rates which came into operation on March 25 last there will be an increase in the income of the department, which will be applied in reducing the amount of the subsidy to the department from the borough fund and rate account. The measured supplies show an increase of 6·30 per cent.; while the domestic and other supplies have increased 1·56 per cent. The bulk supply to Coventry has increased 5·06 per cent.

During last summer, the Elan supply was again on several occasions interrupted by bursts on the aqueduct, but without any interference with the supply to consumers. As under the most favourable circumstances some years must elapse before the supply from Wales can be augmented by the provision of the third pipe, the Committee are continuing their policy of strengthening the aqueduct wherever experience shows this to be advisable. Preliminary work on the third pipe is being proceeded with.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

A special meeting of the Gas Committee of the Glasgow Corporation has been held to consider the rearrangements of the staff of the Gas Department consequent upon the retirement of Mr. James Fleming from the position of Gas Treasurer, and other changes. The Committee's proposals are embodied in a minute they have submitted to the Council. In the Survey Department it is recommended that Mr. James Mann, at present Chief Assistant to the Treasurer, should be appointed Chief Surveyor, at a salary of £350 per annum; that the Survey and Complaints Department should be considered part of the Distribution Department, and that the oversight and direction of these two departments should be added to the work at present undertaken by Mr. R. Halkett, the Commercial Superintendent of the Distribution, at a salary increased to £550 per annum. It is proposed that the financial staff, which in the event of consolidation would be transferred to a general financial department, should be placed under the control of Mr. John B. Ferguson, as cashier—his salary to be £300 per annum; and that the general office staff of the Treasurer's Department should be supervised by Mr. John Smith, the Chief Clerk and Assistant in the General Manager's Department, at a salary of £370 per annum. It is recommended that the whole of these staffs should be under the control of the General Manager (Mr. Alexander Wilson, M.Inst.C.E.), who will perform the duties at present carried out by the Treasurer. If these proposals are adopted, there will, it is estimated, be an annual saving to the Gas Department of £357 5s., after providing an annual payment to the Treasurer of £240, and the allowance of £127 5s. to a retiring Surveyor.

According to the Dundee papers, there is every prospect of the price of gas being increased by 4d. per 1000 cubic feet. The accounts and

estimates have not yet been made up; but it is anticipated, in view of all the circumstances, that this will be the net result. The present price of gas is 2s. 2d. It is seven years since the Dundee consumers had to pay 2s. 6d. per 1000 for their gas. Since then the tariff has gradually fallen, and for the past three years has been 2s. 2d.

A number of families resident in various parts of Dunfermline had an alarming experience early on the morning of May 21, as a result of escapes of gas in their dwelling-houses. In each case the trouble had arisen at the meters, all of which were of the wet type, and, it appears, had not been turned off overnight. In one street four families had narrow escapes with their lives. In a house occupied by a family of three sisters and a brother, the latter was awakened by a strong smell of gas. By this time the three females were in an unconscious condition. Though suffering seriously himself, the brother was able to summon assistance, and the services of a doctor were obtained. In the same street the discovery was made in time to save the life of a little girl. In another thoroughfare practically the whole of the families in a large tenement were affected. Under proper treatment all the patients were restored to consciousness, and by midday on the 22nd they were making satisfactory progress towards recovery. An explanation given of the cause of the accident was that a defect in one of the governors at the gas-works resulted in unusual pressure being thrown upon the supply of gas to the town.

The new tar-distillation plant at the Dundee Gas-Works, which has cost £6600, has been started. The tar is distilled into nine products. Mr. A. Yuill, the Gas Engineer and Manager, has carefully supervised the installation, which, to a certain extent, is experimental. It is computed that the Dundee Gas-Works, as a whole, represent a present value of £465,000. They have been completely renewed, and put into first-rate working order.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *May* 31.

The position of tar products in the London market is quite steady, although prices are practically unchanged. Quotations are as follows: Pitch, 25s. net per ton; creosote, 4¼d. to 4½d. net per gallon in bulk; 90 per cent. toluol, 2s. 4½d. to 2s. 6d. net and naked; sixties carbolic acid, 3s. 6d. to 3s. 7½d. net, casks free; anthracene, 30 per cent., 2¼d. net per unit. It is stated that a large quantity of ordinary London creosote has just been sold at well over 4¼d. net per gallon in bulk at makers' works. Benzol and solvent naphtha are in strong demand at good prices.

Sulphate of ammonia is in considerable demand for delivery up to June, 1916. Prices nominally are £13 7s. 6d. to £13 10s. net per ton for 25 per cent. quality in buyers' bags at makers' works for delivery up to the end of this year; but the difficulty is to find sellers.

Tar Products in the Provinces.

May 31.

The markets for tar products have remained fairly steady throughout the past week. The demand for pitch has been steady, although it is reported that some reasonable prices are quoted. However, distillers are very firm in their ideas of value. Creosote is quiet and difficult to sell at the present moment. Very reasonable prices are being quoted. Solvent and heavy naphthas are in much demand. Crude carbolic is very firm, and high figures are being paid.

The average values of gas-works products during the past week were: Gas-works coal tar, 22s. 9d. to 26s. 9d. Pitch, East Coast, 22s. to 23s. per ton; Norfolk, Suffolk, and Humber ports, 19s. to 20s.; West Coast, 20s. to 21s. Manchester; 21s. to 21s. 6d. Liverpool; 23s. to 24s. Clyde. Benzol, 90 per cent., naked, North, 10½d. to 11d.; 50-90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 2d. to 2s. 4d. Crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 10d. to 1s. 11d. Heavy naphtha, naked, North, 1s. to 1s. 1d. Creosote, in bulk, North, 3d. to 3⅛d. Heavy oils, in bulk, 3⅛d. to 4d. Carbolic acid, casks included, 60 per cent., East and West Coasts, 3s. 5d. to 3s. 6d. Naphthalene, £8 to £16; salts, 75s. to 80s., bags included. Anthracene, "A" quality, 2d. per unit; "B" quality, nominally ¾d.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *May* 29.

There has been no diminution in the strength of the market for this material throughout the week, and a further advance in prices has been recorded. Orders from abroad have again been plentiful; and this fact has had the effect of making both producers and middlemen very firm in their views. The nearest values to-day are £13 17s. 6d. per ton f.o.b. Hull, £13 18s. 9d. per ton f.o.b. Liverpool, and £14 2s. 6d. per ton f o b. Leith. The demand in the forward position has been good, and first-hand transactions have been reported at £14 2s. 6d. for July-December, 1915, and at £14 5s. per ton for January-June, 1916, for delivery at the principal ports.

Nitrate of Soda.

The season now being practically at an end, the tone of this market has become easier, and spot quotations have been reduced to 12s. 6d. per cwt. for ordinary and 12s. 9d. for refined quality.

Sulphate of Ammonia.

From another source it is reported that the market for this article has remained steady, and slightly higher prices are being quoted in other ports. Outside London, makes are quoted at £12 17s. 6d. to £13; Hull, £13 12s. 6d. to £13 15s.; Leith, £13 17s. 6d.; Liverpool, £13 15s. to £13 17s. 6d.; Middlesbrough, £13 15s.

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The economy of gas has been demonstrated to be 50 per cent., and more, over those in general use. In the case of 70/30 brass, the consumption is 2 c' per lb.

WHEN PRINCIPLE II IS APPLIED TO LIGHTING

50-candle power and more is obtainable at low pressure per cubic foot.

WHEN BOTH PRINCIPLES ARE APPLIED TO WATER HEATING

A 97 per cent. efficiency has been obtained.

PRICE LIST.

Pressure balance for ¾-inch gas-main . £10 or quarterly rent of . 10s.
" 1½ " " . £20 " " . 20s.
" 3 " " . £40 " " . 40s.

For sizes above, by arrangement, either on a basis of half economy or by a predetermined arrangement on the basis of the amount of gas consumed in three preceding years.

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4s. to 7s. per lb. capacity according to the quality of fire-clay used.

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By arrangement on a basis of the amount economized.

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INSTITUTION OF GAS ENGINEERS.—Mr. Ionides will be pleased to welcome at his laboratory gentlemen who are in town for the meeting of the Institution.

COAL TRADE REPORT.

Northern Coal Trade.

Though the coal trade of the North has still some difficulty, that of the licences for coal for export is lessened, and the supply of tonnage is better at the ports. Shipments are therefore fuller; and the demand seems brisker on the whole. In the steam coal trade, best Northumbrians are quoted from 22s. 6d. to 23s. 6d. per ton f.o.b. for prompt delivery, and slightly more for forward. Second-class steams are about 19s. 6d. to 20s. 6d. per ton, and steam smalls are stronger at 15s. 6d. to 18s. per ton f.o b.; the demand for export being fuller now that the demand from the North of Europe is more pronounced. In the gas coal trade, the inquiry is stronger; and the fact that coals may now be sent without licence to Italy has in some degree made the market firmer. Best Durhams are about 22s. 6d. to 23s. per ton f.o.b.; and for second-class gas coals 21s. per ton is quoted. "Wear Specials" are steady at 24s. to 24s. 6d. per ton f.o.b. But the demand for Durham coals is generally good for this season of the year, and this, and the desire to stock, is stiffening the market. At the same time, freights are firmer—the current rate for gas coal, Tyne to London, being about 7s. 6d. Some large contracts for coal for Sweden have been placed—at perhaps 23s. 6d. per ton f.o.b. for Durham steams; but it is believed that a quantity of American coals is also included in the sales to the northern country. Coke is firm. Gas coke is less plentiful at present; the quotation being from 19s. to 20s. 6d. per ton f.o.b. in the Tyne.

Collision with a Street-Refuge.

Some time ago, the Stepney Borough Council decided to defend an action commenced by Mr. F. W. Parker, to recover damages and costs in respect of injury to his taxi-cab in consequence of a collision between it and the street-refuge in Commercial Road East. When the action was tried, a verdict for £109 was given against the Council. Commenting upon this, the Finance Committee of the Council state that they have now reviewed the circumstances connected with the claim, and have been in consultation with the Electricity Committee. At the time the recommendation to defend the action was made, by an unfortunate misunderstanding, the information then before the Committee led to the belief that the lamp on the refuge was extinguished under instructions from the Admiralty and the Police, and was, moreover, not in lighting in exercise of the discretion conferred upon the Council by section 130 of the Metropolis Management Act, 1855. It transpired subsequently, however, that the lamp had been in lighting continuously up to the date of the accident; but it failed to light that night, when the attendant went to switch it on, and the defect was not remedied until the day following the collision. This information did not come to the knowledge of the Committee until after the trial of the action. Had it been before them prior to the time when the Committee recommended defending the claim, they would have endeavoured to settle the matter, and avoid litigation.

Proposed Increase in Price at Leeds.

A proposal will be submitted by the Gas Committee at to-morrow's meeting of the Leeds City Council to increase the charge for gas 3d. per 1000 cubic feet. The prices vary, being based upon the consumption each quarter; but the increase of 3d. will be applied all around. Those who use less than 500,000 cubic feet will pay 2s. 5d. per 1000 cubic feet, instead of 2s. 2d.; between 500,000 and 750,000 cubic feet, the price will be 2s. 4d., instead of 2s. 1d.; between 750,000 and 1,000,000 cubic feet, 2s. 3d., instead of 2s.; between 1,000,000 and 2,000,000 cubic feet, 2s. 2d., instead of 1s. 11d.; and over 2,000,000 cubic feet, 2s. 1d., in place of 1s. 10d. To gas consumers by prepayment meter, the charge is raised from 2s. 5d. to 2s. 8d.; and to those with a prepayment meter and cooker, from 2s. 8d. to 2s. 11d. These prices will obtain within the city. At Stourton, those paying 2s. 11d., 3s. 3d., or 3s. 6d. (according to the method of supply) will after July 1 pay 3s. 2d., 3s. 6d., or 3s. 9d.; while at Adel the flat-rate of 3s. will be raised to 3s. 3d. It is understood that, but for the forethought exercised by the Gas Committee in placing the existing coal contracts, the prospects from the consumers' point of view would have been much more serious.

West Bromwich Council and the Price of Gas.

At their meeting to-morrow, the West Bromwich Town Council will have before them a report from the Gas Committee, who state that they have had under consideration the scale of charges at present in force; and owing to the great advance in the price of coal and gas oil, the increased cost of tubes and fittings, meters, and stores generally, and the increased wages and war bonuses recently granted, the Committee are reluctantly compelled, in common with other gas undertakings, to increase the price of gas to all consumers 6d. per 1000 cubic feet. For motive power and manufacturing purposes the prices will be from 1s. 10d. to 2s. 1d. per 1000 cubic feet, for other purposes from 2s. 7d. to 3s., and for high-pressure lighting 3s. 6d. per 1000 cubic feet. The annual accounts of the undertaking show a total income for the year of £62,373, a decrease of £70 compared with the previous year. The gross profit amounts to £11,352; and after paying interest and sinking fund charges, the net profit is £1307, as compared with £1238 for the previous year—an increase of £69. This balance has been carried to the net revenue appropriation account, against which has been charged the sum of £806 expended during the year on automatic street-lamp controllers, and £2759 the balance of the cost of vertical retorts in excess of the loan sanctioned by the Local Government Board.

Toluol a Contraband.—Among the articles which, according to a Royal Proclamation in a supplement to the "London Gazette," will henceforth be treated as absolute contraband, are toluol and mixtures of it, whether derived from coal tar, petroleum, or any other source.

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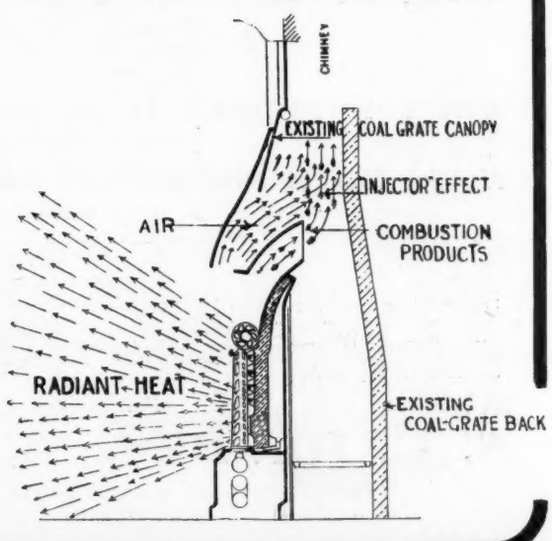

Coal and Gas Prices at Wallasey.

It was reported by Mr. Chantrell (the Chairman of the Gas and Water Committee), at a meeting of the Wallasey Town Council last Thursday, that the Committee recommended the acceptance of tenders for 56,000 tons of coal, at an advance of practically 6s. per ton, representing about £18,000 over last year, for the twelve months ending June next. In order to meet this tremendous increase of expenditure, the Committee, after full consideration, found that the only thing was to increase the price of gas from 2s. to 2s. 4d. per 1000 cubic feet, and to withdraw the rebate of 2d. in the shilling allowed to users of slot-meters. The increased charges for gas would represent about £10,000 per year. If they could keep up the present price of coke, this would make £6500 to £7000; so that they would thus be recouped the extra £18,000 to be expended on coal. The Mayor expressed the opinion that the matter should not be rushed, and the Council should have an opportunity of considering it fully. Alderman Dawson said the extra £18,000 would have to be provided during the current financial year. In addition to the extra charges to ordinary consumers and users of slot-meters, there would have to be a *pro ratâ* increase on power charges, according to the quantity of gas consumed. He would further suggest that it might be necessary to get assistance from the Electricity Committee, by way of increased charges for current. Further consideration of the matter was deferred.

Increased Price at Shotley Bridge.—The Directors of the Shotley Bridge and Consett District Gas Company announce that from the 30th inst. the price of gas to ordinary consumers will be increased 6d. per 1000 cubic feet, bringing it up to 3s. 10d.; while the discount of 6d. per 1000 cubic feet hitherto allowed for accounts paid within a specified time will be reduced to 1d. The advance in the price of coal, consequent upon the war, is the reason assigned for this course.

Chelmsford Corporation Bill.—The Parliamentary Committee reported, at last week's meeting of the Chelmsford Town Council, with reference to the Corporation Gas Bill, that negotiations had proceeded with the Gas Company, and as a result the matter had been settled. The terms include: (1) The purchase price to be determined in the ordinary course, and the transfer of the undertaking by the Company to the Corporation to take place on the agreed or fixed date as provided by the Bill. (2) The Corporation to apply for, and use their best endeavours to obtain the consent of the Treasury to raise money for payment of the purchase price. (3) If the Treasury clause is in operation, and consent to raise money is not obtained by the date fixed by the Bill for the transfer, the Corporation to pay interest at the rate of 5 per cent. per annum on the purchase-money until payment or until one month after the Treasury clause becomes inoperative—*i.e.*, by obtaining consent or effluxion of time—whichever is the earlier. If the purchase-money is not paid within one month after the Treasury clause becomes inoperative, the Corporation to pay interest at the rate of 10 per cent. per annum on the purchase-money until payment.

Leek Water Profits and the Rates.—The Leek Urban District Council Water Committee have had submitted to them a statement of the water accounts for the past twelve months, with the estimate for the current year. The Committee recommend that £1700 be handed over to the district fund for the relief of the rates.

Billingborough Gas Company.—The Directors have given notice of their intention to increase the price of gas by 10d. per 1000 cubic feet from July 1; the rise being necessitated by the higher cost of coal. The annual report, which has just been issued, shows that the available balance amounts to only £118; the Directors recommending that the whole of this shall be carried forward to meet current expenses and the cost of repairs rendered necessary at the works.

Ilkeston Corporation Scenes.—Following the scenes at the last meeting of the Ilkeston Town Council [*ante*, p. 349], when there was an acrimonious debate upon the Gas Committee's report and other matters, leading to the ejectment of Councillor W. Smith, the latter has caused summonses for assault to be issued against the Mayor (Mr. J. A. Macdonald), the Chairman of the Gas Committee, the mace bearer, and police officers concerned upon the occasion. The cases are fixed for hearing on Thursday.

A Soldier's Death by Gas.—A private in the Cheshire Regiment, who should have returned to his duties after three days' leave, was found dead with his wife in their house at West Leigh on Monday night of last week. He had stated to another soldier in the same company that he did not think he would be going back; and when the latter called on him he found the door fastened. Becoming suspicious, he forced the door open; and the man and his wife were found in the kitchen lying dead on the bed, with their heads inside the gas-oven.

Increased Price at Mansfield.—Though situate in one of the richest coal areas in England, and with an abundance of the raw material close to hand, the Mansfield Corporation have found themselves driven to the necessity of increasing the price of gas 6d. per 1000 cubic feet. In illustration of growing demands, it is at the same time interesting to note that the Corporation have it in contemplation to undertake important extensions at the gas-works, for which purpose it was mentioned at the last meeting of the Council that a plan in relation to the land required is now under consideration.

Wages Agitation at Nottingham.—Not content with the decision of the Nottingham City Council conceding a war bonus of 2s. weekly to the municipal employees of non-military age earning less than 30s. a week, the Gas-Workers' Union have entered upon a vigorous campaign for securing the increase to all employees. But, according to the explanation forthcoming from chairmen of committees, the Corporation have already dealt more than generously with the matter; and in view of the circumstance that increased financial necessities have imposed on the Council the obligation to raise the district rate by 5d. in the pound for the ensuing year, it is doubtful whether the latest demand can be conceded consistently with equitable financial arrangements.

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Oswaldtwistle Gas Undertaking.—The total income of the Oswaldtwistle Gas-Works for the past year was £13,330, and the working expenses £9386, leaving a gross profit of £3944, out of which £169 has been spent in renewals, and £2571 on interest and sinking fund charges. There is thus a net profit of £1204 for the year. The cost of public lighting, met by the Gas Committee, was £1096.

Sedgley Gas Undertaking.—The quantity of gas made by the Sedgley Urban District Council during the year ended March 31 last was 45,895,000 cubic feet, an increase of 5,573,000 cubic feet on the previous year. The total amount sold was 40,235,700 cubic feet, an increase of 4,803,900 cubic feet. The coal carbonized was 3672 tons; the average yield per ton being 12,500 cubic feet, as compared with 12,174 cubic feet for the year before—an increase of 326 feet.

Blackburn Gas-Workers' Wages Increased.—In view of Judge Parry's award in the Blackburn trades dispute, the Committee appointed by the Blackburn Corporation to deal with applications for increases in wages met on Friday to reconsider the application of the National Union of Gas Workers and General Labourers, and decided to give an increase of 2s. per week to gas, water, and lamp-lighting employees. Advances were refused to the shift-workers in the Gas Department.

Ely Gas and Electricity Order.—It has already been recorded in the "JOURNAL" that the Ely Gas and Electricity Company, Limited, have applied to the Board of Trade for a Provisional Order to enable them to supply electricity in the Ely urban district. It is announced that the Board had communicated with the objectors, among whom were the Ratepayers' Association, to the effect that, after careful consideration of all the circumstances of the case, they had decided not to proceed with the application.

Oldham Water Supply.—At the meeting of the Water Committee of the Oldham Corporation last Wednesday, the General Manager (Mr. A. Andrew) reported that the Borough Treasurer had informed him that the result of the past financial year's working of the department showed a net profit of £6172, against £10,719 in 1913-14. There was a balance to the credit of profit and loss account of £5739; and the General Manager recommended that £25,000 should be added to the reserve fund, which would then amount to £42,000.

New Verticals at Nottingham.—Preliminary operations in connection with the installation of a new Woodall-Duckham vertical retort plant have not been long in progress at the Basford Gas-Works (Nottingham) before a labour dispute has arisen as to the wages of men engaged in demolishing the old retort-houses and benches to make room for the new plant. The matter turns on whether building trade rates are to be paid for pulling down the old structure; a deputation who waited upon the Gas Engineer (Mr. John Wilkinson) some time ago having, it is understood, failed in the endeavour to get the whole work classified as building construction. Another deputation interviewed the Gas Committee on Friday, with the result that a promise was made to return an answer to the application at an early date.

APPLICATIONS FOR LETTERS PATENT.

7356.—VALENTINE, H. S., "Gas water-heaters." May 17.
7364.—STILL, CARL, "Removing and loading a mass of coke located on a quenching bench." May 17.
7404.—FRISCH, A., AND CO., "Recording meter readings." May 17.
7437.—RYAN, W. G., "Gas soldering-iron." May 18.
7461.—MORRISS, G., "Gas water-heaters." May 18.
7470.—PEARSON, R., and SCOTT, C. J. F., "Gas-geysers." May 18.
7510.—STURGE, W. H., "Suspending gas-pendants." May 19.
7518.—JAMES, J. C., "Flange joint for gas-retort settings." May 19.
7528.—WILLIAMS, P. E., "Purification of gas." May 19.
7535.—LEWIS, G. P., "Treatment of hydrocarbons." May 19.
7648.—CUTLER, S., "Gas producers or furnaces having clinkering grates." May 21.
7689.—COOKE, E. L., "Deflector for gas-burners." May 22.

Beccles Water and Gas Company.—The Directors reported at the annual meeting of the Company that the decrease of revenue and increase of the annually recurring expenditure of the Company, consequent upon the war, which had already occurred, and were anticipated for the future, were so great that they could not recommend any higher dividend to be declared than 5 per cent. upon all classes of shares, less income-tax. The Company have usually paid 10 per cent. on classes "A" and "B," and 8 per cent. on classes "C" and "D."

Gas Prices at Hyde.—Owing to the increase in the price of coal, higher wages and rates, and the fall in the market value of certain residual products, the Directors of the Hyde Gas Company have decided to increase the price of gas 6d. per 1000 cubic feet, from the reading of the meters for the June quarter. The rates of discount will, however, remain in force as hitherto. At the same time, a similar increase to all slot-meter consumers will come into operation by reducing, from 25 to 22 cubic feet, the quantity of gas supplied for 1d.

A Hundred Years Ago.—The "Exeter Flying Post" of Saturday reproduced the following advertisement, which appeared in its columns a hundred years ago: "Exeter, May 27, 1815. At a meeting, held at the Hotel, the 24th of April last (Edw. Gattey, Esq., Chairman), to consider a plan for lighting the City of Exeter with gas, it was proposed and resolved that a Committee should be appointed to report on the expediency of this measure. On the 29th of April the Committee met in the Guildhall (Edmund Granger, Esq., Chairman), and, having discussed the subject, it was resolved to be expedient to light the city with gas. Mr. R. Phillips, jun., Mr. M. Barrett, and Mr. Golsworthy were authorized to proceed to London, to obtain information on all points relating to the subject. On the 27th of May, at a meeting (the Right Worshipful the Mayor presiding), it was resolved that an association should be established with the title of 'The Exeter Gas Light Company;' and that a capital of £12,000 should be raised, in shares of £50 each, from inhabitants of Exeter. John Hart, Chairman."

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(ASSOCIATED WITH JOHN WRIGHT & EAGLE RANGE LTD., ESSEX WORKS, BIRMINGHAM.)

Works and Head Office: Mulberry Street, Hulme, *Branch Works:* Vernon Street, Longsight, MANCHESTER.

A cloth-bound loose-leaf catalogue of their specialities just issued by Messrs. Wilsons and Mathiesons, Limited, of Armley, Leeds, forms quite a substantial volume, in spite of the fact that it deals only with gas appliances which are of the most modern construction, and suitable for present-day use. The apparatus described is for all kinds of uses. There are described and illustrated household washing-coppers, of which the firm are extensive makers; and mention may be also made of the "Circulator" water-heaters and "Canyon" geysers. Cookers of all sizes find a place in the catalogue; and a section is devoted to patterns of combination ranges, for the use of either gas or coal. The firm's well-known "Sola" series of gas-fires, of course, find a prominent place, as well as their numerous other patterns of heating appliances. The "Sola" series, it may be pointed out, include the "Sunbeam" inset gas-fire. This is easily fixed, and is designed to fit into (form part of) the existing register grate or interior, and to look like a coal-fire. It is, the firm say, "an efficient gas-fire of perfect construction," which fully meets the requirements of those who insist on a gas-fire in their existing grate looking like a coal-fire, and having open ventilation up the chimney. The various specialities are also dealt with in separate artistically prepared booklets.

GAS COMPANIES IN THE STOCK EXCHANGE.

Business commenced very sluggishly upon the re-opening of the Stock Exchange on Tuesday, and, after a short-lived quickening in midweek, it relapsed into quietude until the close. The war news, in regard both to operations abroad and to munitions at home, was not so wholly favourable as to create buoyancy, and some declared there was at times a scarcity of stock in the markets. Thus business was small; but prices did not seem to be affected to any large extent. Rails were naturally depressed by the Carlisle tragedy; but gilt-edged securities, and especially the short-dated issues, were in demand. Of the latter, the North-Eastern Railway was a great success. Others similar are in course of issue, and more are talked of. But care will have to be exercised that too many of these do not fall due for redemption at the same time. Our new Chancellor of the Exchequer will have to consider this point when the Treasury sanction is being applied for. Some of the Stock Exchange regulations may also be reviewed; and the new "selling out" rule is not wholly satisfactory. The Banks' early closing question is still in the air; but the Exchange does not seem very keenly interested. Business in the Gas Market was as quiet as elsewhere, and a good many issues which are commonly dealt in were not touched at all. The general tone was steady, and prices exhibited hardly any perceptible changes. The Money Market was a shade firmer, both for short loans and for discount.

Bargains done for cash during the week were as follows: On Tuesday, Commercial 4 per cent. 94, Gas Light ordinary 88⅛, 89, 89½, South Suburban 100, 100½. On Wednesday, Bournemouth 10 per cent. 29, 29⅛, ditto "B" 13 5/16, 13 7/16, Gas Light debenture 68, Oriental 107½, South Metropolitan 94¼. On Thursday, Gas Light ordinary 88⅛, 88⅜, 89, 89½, ditto debenture 68¼, 68½. On Friday, Bournemouth "B" 13 13/16, 13⅞, Gas Light ordinary 88⅛, 88⅜, ditto maximum 70½, ditto preference 87¼, 88, Imperial Continental 81½, Oriental 105, River Plate 77½, South Metropolitan 94¼, 95. On Saturday, Commercial 3⅛ per cent. 92½, Gas Light ordinary 89½, 88⅞, 89⅛, 89¼, South Metropolitan 94½, 95.

Bank rate (fixed Aug. 8), 5 per cent.; last year, 3 per cent.

LOWEST AND HIGHEST PRICES OF BARGAINS DONE FOR CASH IN THE WEEK ENDING MAY 29.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices. July 30.	Yield on Highest Closing Price.	Lowest and Highest Prices of Bargains.
£			p.c.			£ s. d.	
1,551,868	Stk.	April 8	2½	Alliance & Dublin Ord.	59—64	3 18 2	..
374,000	,,	July 10	4	Do. 4 p.c. Deb.	76—79	5 1 3	..
280,000	5	April 29	7½	Bombay, Ltd.	5⅞—6⅜	5 17 8	..
50,030	10	Feb. 26	16	Bournemouth Gas and Water { 10 p.c.	29—30	5 6 8	29—29⅛
873,480	10	,,	7	Bournemouth Gas and Water { B 7 p.c.	15—15½	4 10 4	13 5/16—13 7/16
95,000	10	,,	6	Bournemouth Gas and Water { Pref. 6 p.c.	13½—14	4 5 9	..
—	—	—	—	Bournemouth Gas and Water { Deb.	..	—	..
380,000	Stk.	Feb. 26	14	Brentford Consolidated	261—266	5 5 3	..
330,000	,,	,,	11	Do. New	204—209	5 5 3	..
58,000	,,	,,	5	Do. 5 p.c. Pref.	109—111	4 10 1	..
206,250	,,	June 11	4	Do. 4 p.c. Deb.	91—93	4 6 0	..
217,380	Stk.	Feb. 26	11	Brighton & Hove Orig.	208—213	5 3 4	..
244,200	,,	,,	8	Do. A Ord. Stk.	154—159	5 0 8	..
630,000	20	Mar. 26	12½	British	44—45	5 11 1	..
120,000	Stk.	June 26	4	Do. 4 p.c. Deb. Stk.	88—90	4 8 11	..
345,771	Stk.	June 26	4	Buenos Ayres 4 p.c. Deb.	85—87	4 12 0	..
100,000	10	—	—	Cape Town & Dis., Ltd.	1½—2½	—	..
100,000	10	—	—	Do. 4½ p.c. Pref.	4—6	—	..
100,000	Stk.	June 26	4½	Do. 4½ p.c. Deb. Stk.	70—75	6 0 0	..
157,150	Stk.	Feb. 26	5	Chester 5 p.c. Ord.	103—110	4 10 11	..
1,513,280	Stk.	Feb. 12	5/9/4	Commercial 4 p.c. Stk.	106—108	5 1 2	94
560,000	,,	,,	5½	Do. 3½ p.c. do.	103—105	5 1 6	92½
475,000	,,	June 11	3	Do. 3 p.c. Deb. Stk.	69½—71½	4 3 11	..
800 000	Stk.	,,	4	Continental Union, Ltd.	76—79	5 1 3	..
200 000	,,	,,	7	Do. 7 p.c. Pref.	115—118	5 18 8	..
—	—	—	—	Croydon B and C 7 p.c.	..	—	..
492,270	Stk.	—	6	Derby Con. Stk.	123—125	4 16 0	..
55,000	,,	—	4	Do. Deb. Stk.	102—104	3 16 11	..
1,009,180	10	July 29	10	European, Ltd.	17½—18	5 11 1	..
16,361,910	Stk.	Feb. 12	4/17/4	Gas Light and Coke { 4 p.c. Ord.	98—102	4 15 6	88½—89½
2,600,000	,,	,,	3⅛	Gas Light and Coke { 3⅛ p.c. max.	76—79	4 8 7	70½
4,062,235	,,	,,	4	Gas Light and Coke { 4 p.c. Con. Pref.	96—99	4 0 10	87½—88
4,674,850	,,	June 11	3	Gas Light and Coke { 3 p.c. Con. Deb.	72½—74½	4 0 6	68—68½
130,000	,,	,,	10	Gas Light and Coke { 10 p.c. Bonds	..	—	..
258,740	Stk.	Mar. 12	5	Hastings & St. L. 3½ p.c.	87—89	5 12 4	..
70,000	10	April 29	11	Hongkong & China, Ltd.	16½—16⅝	6 11 4	..
—	—	—	—	Hornsey 7 p.c.	..	—	..
131,000	Stk.	Mar. 12	7⅞†	Ilford A and C	151—154	5 2 4	..
65,780	,,	,,	6⅜†	Do. B	115—118	5 8 0	..
65,500	,,	June 26	4	Do. 4 p.c. Deb.	92—94	4 5 1	..
4,940,000	Stk.	May 14	9	Imperial Continental	150—160	5 12 6	81½
1,335,000	Stk.	Feb. 12	3½	Do. 3½ p.c. Deb. Red.	84—86	4 1 5	..
200,342	Stk.	Mar. 12	6½	Lea Bridge Ord. 5 p.c.	119—121	5 7 5	..
561,000	Stk.	Feb. 26	10	Liverpool 5 p.c. Ord. { A	211—213	4 13 11	..
718,100	,,	,,	7	Liverpool 5 p.c. Ord. { B	146—148	4 14 7	..
306,083	,,	June 26	4	Do. 4 p.c. Pr. Deb. Stk.	..	—	..

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices. July 30.	Yield on Highest Closing Price.	Lowest and Highest Prices of Bargains.
£			p.c.			£ s. d.	
75,000	5	June 11	6	Malta & Mediterranean	4¼—4⅝	6 9 9	..
250,000	100	April 1	4½	Met. of Melbourne { 4½ p.c. Deb.	99—101	4 9 1	..
541,920	20	May 28	4	Monte Video, Ltd.	11¼—12	6 13 4	..
1,775,892	Stk.	July 29	4½	Newc'tle&G'tesh'd Con.	98½—99½	4 10 6	..
529,705	Stk.	June 26	3½	Do 3½ p.c. Deb.	82—83	4 4 10	..
55,940	10	Feb. 26	7/14/0	North Middlesex 7 p.c.	14—15	5 2 8	..
300,000	Stk.	May 14	8	Oriental, Ltd.	117—122	6 11 2	105–107½x
60,000	5	Mar. 26	10	Ottoman, Ltd.	7⅜—7⅝	6 9 0	..
60,000	50	Feb. 26	13	Portsea, Island B	128—131	4 19 3	..
100,000	50	,,	12	Do. C	118—121	4 19 2	..
52,000	50	,,	10	Do. D	..	—	..
249,980	5	April 29	8	Primitiva Ord.	5½—6	6 18 4	..
499,960	5	June 26	5	,, 5 p.c. Pref.	4½—5	5 0 0	..
521,600	100	June 2	4	,, 4 p.c. Deb.	91—93	4 6 0	..
—	—	—	—	,, ,, ,, 1911	..	—	..
346,198	Stk.	June 26	4	River Plate 4 p.c. Deb.	85—87	4 12 0	77½
150,000	10	May 14	6	San Paulo { 6 p.c. Pref.	10½—11	6 9 1	..
125,000	50	July 1	5	San Paulo { 5 p.c. Deb.	47—49	5 2 0	..
135,000	Stk.	Mar. 12	10	Sheffield A	223—224	4 9 3	..
209,984	,,	,,	10	Do. B	222—224	4 9 3	..
523,500	,,	,,	10	Do. C	220—222	4 10 1	..
90,000	10	May 28	9	South African	10½—11½	7 16 6	..
6,429,895	Stk.	Feb. 12	5/9/4	South Met., 4 p.c. Ord.	111—113	4 16 8	94½—95
1,895,445	,,	July 10	3	Do. 3 p.c. Deb.	72½—74½	4 0 6	..
209,820	Stk.	Feb. 26	8½	South Shields Con. Stk.	157—159	5 6 11	..
952,795	Stk.	Feb. 26	6	S'th Suburb'n Ord. 5 p.c.	114—116	5 3 5	100—100½
60,000	,,	,,	5	Do. 5 p.c. Pref.	110—112	4 9 3	..
—	—	—	—	Do. West Kent.	..	—	..
137,058	,,	June 26	5	Do. 5 p.c. Deb. Stk.	116—118	4 4 9	..
629,740	Stk.	May 14	5	Southampton Ord.	99—102	4 18 0	..
120,000	Stk.	Feb. 12	7½†	Tottenham-District { A 5 p.c.	135—138	5 8 8	..
742,275	,,	,,	6†	Tottenham-District { B 3½ p.c.	115—117	5 2 7	..
181,255	,,	June 26	4	Tottenham-District { 4 p.c. Deb.	87—89	4 9 11	..
182,380	10	Dec. 30	5	Tuscan, Ltd.	5—6	8 6 8	..
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	93—95	5 5 3	..
236,476	Stk.	Mar. 12	5	Tynemouth, 5 p.c. max.	108½—109½	4 11 4	..
				Wandsworth, Wimbledon, and Epsom—			
30,000	Stk.	Feb. 26	8⅜	Wandsworth A 5 p.c.	151—156	5 7 4	..
255,636	,,	,,	6⅜	,, B 3½ p.c.	129—134	5 2 7	..
108,075	,,	,,	5/17/3	,, C 3½ p.c.	110—115	5 2 0	..
352,000	,,	,,	6⅜	Wimbledon 5 p.c.	117—122	5 0 5	..
98,000	,,	,,	6⅜	Epsom 5 p.c.	121—126	5 5 2	..
88,416	,,	June 26	3	3 p.c. Deb. Stk.	66—69	4 6 11	..

x Bargains marked thus are "Ex div."

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

CHIEF GAS ENGINEER AND MANAGER. Stoke-on-Trent Corporation. Applications by June 12.
WORKS SUPERINTENDENT. Birkenhead Gas Department. Applications by June 9.
GENERAL CLERK AND STOREKEEPER. No. 6048.

Plant, &c. (Second Hand), for Sale.

CENTRE VALVE, STATION METER, &c. Darlington Gas Department.

"Journal" Volumes and Gas Books for Sale.

No. 6047.

Sales of Stocks and Shares.

SUTTON WATER COMPANY, London Mart. June 8.
WANDSWORTH, &c., GAS COMPANY. London Mart, June 15.

TENDERS FOR

Coal.

LEIGH (LANCS.) GAS AND WATER DEPARTMENT. Tenders by June 11.
NEWHAVEN GAS COMPANY. Tenders by June 5.
NORTHWICH GAS COMPANY. Tenders by June 12.
ROCHESTER, &c., GAS COMPANY. Tenders by June 9.
SMETHWICK GAS DEPARTMENT. Tenders by June 8.
SPALDING GAS DEPARTMENT. Tenders by June 5.
SPENBOROUGH URBAN DISTRICT COUNCIL. Tenders by June 9.
SUTTON (SURREY) GAS COMPANY. Tenders by June 4.
TYLDESLEY URBAN DISTRICT COUNCIL. Tenders by June 7.

Exhauster.

STOURBRIDGE GAS DEPARTMENT. Tenders by June 15.

General Stores (Lead Pipe, Lime, Vitriol, &c.).

LEIGH (LANCS.) GAS AND WATER DEPARTMENT. Tenders by June 11.
TYLDESLEY URBAN DISTRICT COUNCIL. Tenders by June 7.

Meters.

TYLDESLEY URBAN DISTRICT COUNCIL Tenders by June 7.

Oil for Gas Making.

LEIGH (LANCS.) GAS AND WATER DEPARTMENT. Tenders by June 11.

Pipes, &c.

LEIGH (LANCS.) GAS AND WATER DEPARTMENT. Tenders by June 11.
TYLDESLEY URBAN DISTRICT COUNCIL. Tenders by June 7.

Tar and Liquor.

MACCLESFIELD GAS DEPARTMENT. Tenders by June 14.
READING GAS COMPANY. Tenders by June 14.
SUTTON (SURREY) GAS COMPANY. Tenders by June 4.

Tar Dehydrator (Centrifugal).

No. 6046.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 171, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

SEND YOUR INQUIRIES FOR

CARBURETTED HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS, to

BALE AND HARDY,
39, VICTORIA STREET, WESTMINSTER, S.W.

D. ANDERSON AND COMPANY,
GAS LIGHTING ENGINEERS AND CONTRACTORS.
18 & 20, FARRINGDON ROAD, LONDON, E.C.
Telegrams: "DACOLIGHT LONDON." Telephone: 2336 HOLBORN.

HUTCHINSON BROTHERS, Ltd.,
FALCON WORKS, BARNSLEY.

MANUFACTURERS OF
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS and SQUARE LANTERNS for Street Lighting,
INVERTED BURNERS and CONVERSION SETS for Street Lamps.

SULPHURIC ACID.

SPECIALLY prepared for Sulphate of AMMONIA Makers by
CHANCE AND HUNT, LIMITED.
Works: OLDBURY, WEDNESBURY, AND STAFFORD.
Address Correspondence and Inquiries to OLDBURY, WORCS.
Telegrams: "CHEMICALS, OLDBURY."

TAR WANTED.
THOMAS HORROCKS & SONS, LTD.,
Albert Chemical Works,
NORTON STREET, MILES PLATTING, MANCHESTER.
Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Carbolic, Lysol, Sulphate of Ammonia.

SPENCER'S PATENT HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, May 11, p. 314.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the best. Satisfaction Guaranteed.

JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 years. References given to Gas Companies.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, London, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB LONDON."

TAR WANTED.
JOSEPH A. HUTCHISON, LIMITED,
HIGHBRIDGE WHARF, SOMERSET.

SULPHURIC ACID.

SPECIALLY prepared for the manu-facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD.,
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Telegrams: "HYDROCHLORIC, FEN. LONDON."
Telephone: 1588 AVENUE (3 lines).

ENQUIRIES SOLICITED.

FOR Gas-Works Plant of Every De-scription; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.
C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

ALDER AND MACKAY
(ESTABLISHED 1850).
WET AND DRY METERS.
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS.
EDINBURGH.

TAR WANTED.
THE Burnden Tar Company (Bolton), Ld.
HULTON CHEMICAL WORKS, BOLTON.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: "SATURATORS BOLTON." Telephone 0848.

GAS PLANT for Sale—We can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Church Fenton, near LEEDS.

RICHARDSON'S
"PLUTONIC" FIRE CEMENT.
(Powder or Paste).
For Gas Retort and Furnace Repairs, &c.
(42nd Year of Sale).
Prices and Samples free on Application.
THE "PLUTONIC" CEMENT COMPANY,
Telegrams: "PLUTONIC, BIRMINGHAM." 62, BISSELL STREET, BIRMINGHAM.

PATENTS AND TRADE MARKS
PUBLICATIONS: "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

OXIDE OF IRON.
We are in a position to Supply Oxide of Iron promptly, and invite Enquiries.
SPENT OXIDE WANTED.
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5, CROOKED LANE, LONDON, E.C.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.
5, CROOKED LANE, LONDON, E.C

"KLEENOFF," THE COOKER CLEANSER.
Tins for sale to Consumers.
In Bulk for Works Use.
BALE & CHURCH, LTD.
5, CROOKED LANE, LONDON, E.C.

"GAZINE" (Registered in England and Abroad). A radical Solvent and Preventative of Naphthalene Deposits, and for the Automatic Cleaning of Mains and Services.
It is also used for the Enrichment of Gas.
Manufactured and Supplied by C. BOURNE, West Moor Chemical Works, KILLINGWORTH, or through his Agents, F. J. NICOL & Co., Pilgrim House, NEWCASTLE-ON-TYNE.
Telegrams: "DORIC," Newcastle-on-Tyne. National Telephone No. 2497.

AMENDED ADVERTISEMENT.

COUNTY BOROUGH OF STOKE-ON-TRENT.

APPOINTMENT OF CHIEF GAS ENGINEER AND MANAGER.

THE Corporation of Stoke-on-Trent invite APPLICATIONS for the Position of CHIEF GAS ENGINEER AND MANAGER of their Gas Undertakings, which comprise Four Works situate at Burslem, Stoke, Fenton, and Longton.

The Salary will be £500, rising to £700 per Annum. The Person Appointed will be required to reside in the Borough, and to devote the whole of his time to the Duties of the Office, and will not be allowed to engage in Private Practice.

Canvassing, either Directly or Indirectly, will be regarded as a Disqualification.

Applications, stating Age, Qualifications, and Experience, accompanied by *copies* of not more than Three recent Testimonials, and endorsed "Gas Engineer," should be sent to the undersigned not later than Twelve Noon on Saturday, the 12th of June, 1915.

E. B. SHARPLEY,
Town Clerk.

Town Hall, Stoke-on-Trent,
May 27, 1915.

BIRKENHEAD CORPORATION.

WORK'S SUPERINTENDENT.

THE Gas Committee of the Corpora-tion require a Thoroughly Competent WORK'S SUPERINTENDENT.

He must be Well Trained with Good Technical Education and accustomed to Modern Plant and Conditions of Manufacture. One accustomed to Vertical Retorts, Electrical Power, and Carburetted Water-Gas Plant preferred.

Commencing Salary, £250 per Annum, with £10 per Annum increment up to £300 per Annum. No House, Coal, or Gas.

List of duties can be obtained from the Gas Engineer.

Applications, accompanied by three Testimonials, to be sent to me at the Town Hall, Birkenhead, on or before June 9, 1915.

Canvassing, directly or indirectly, will be deemed a Disqualification.

JAMES FEARNLEY,
Town Clerk.

May 20, 1915.

WANTED, by a Gas Company in the West of England, a GENERAL CLERK and STOREKEEPER.

Apply, by letter, stating Age, Experience, and Wages required, with *copies* of Testimonials, to No. 6048, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C.

CENTRIFUGAL TAR DEHYDRATOR.

WILL any English Firm having Manufactured a Successful Machine for the above Purpose, kindly communicate with No. 6046, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C.?